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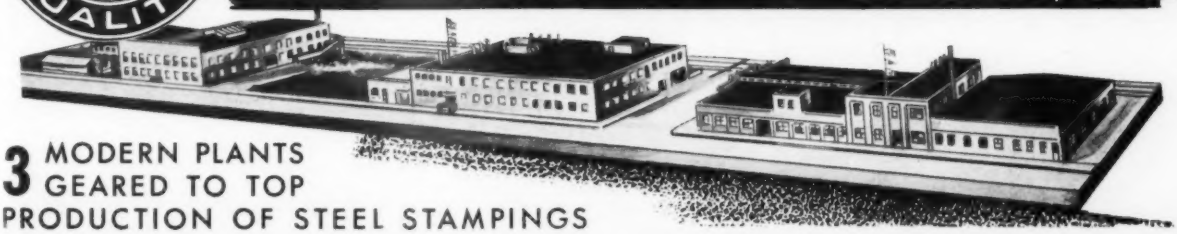

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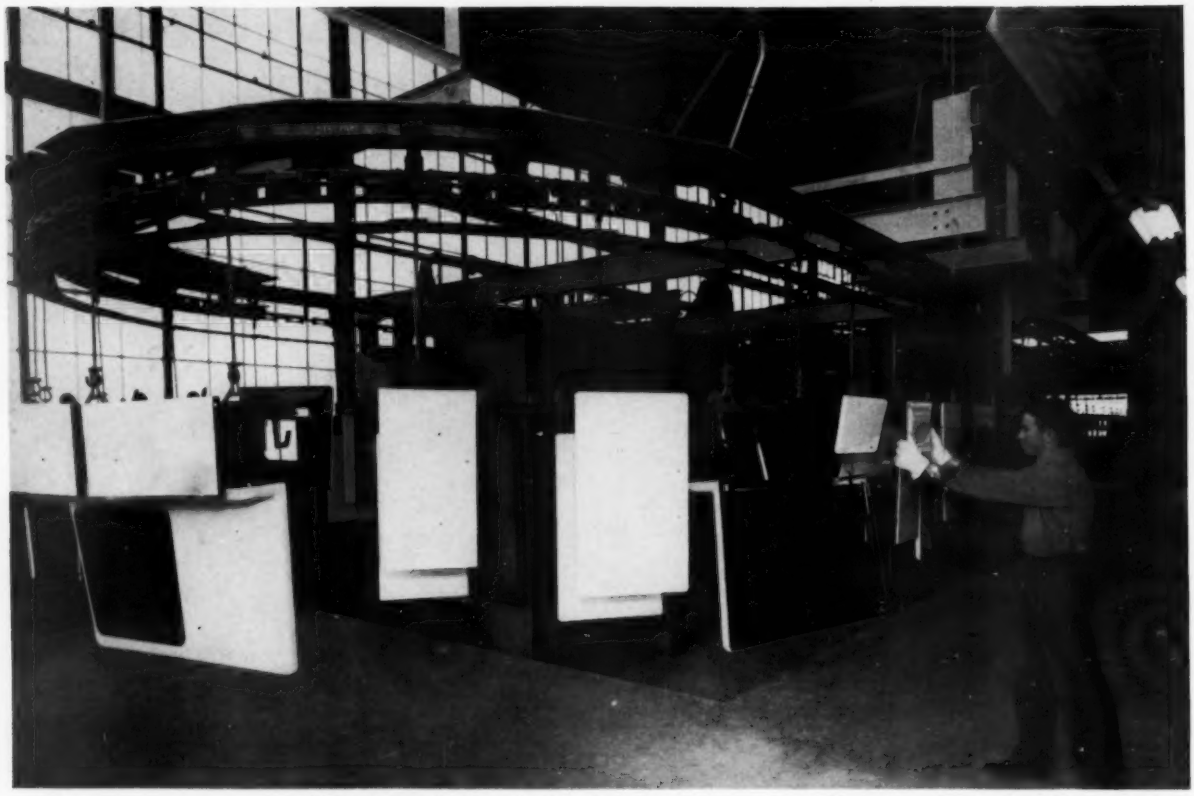

This photograph shows the Boland continuous furnace in the Brown Stove Works plant, Cleveland, Tenn.

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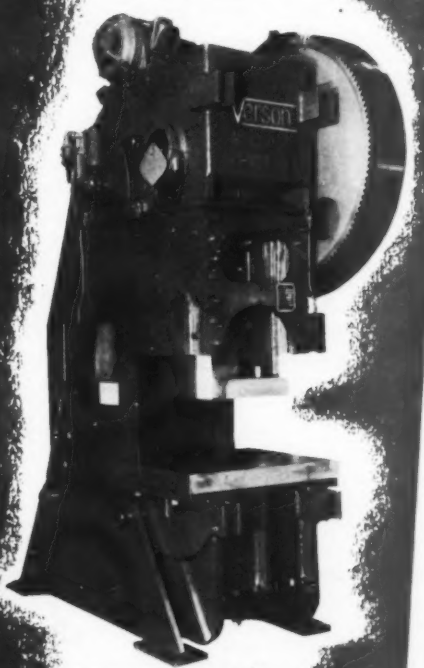

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All standard units (capacity from 5 to 1200 or more gallons per hour) a compact and completely self-contained. And the ease with which they're install operated and maintained further assures long, efficient service and reliable results. For complete data on FILT-R-STIL Demineralizers and assistance in solving *your* water problems—mail coupon *today*.

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Company _____

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City _____ *State* _____

THE Finish Line

AS FINISH STARTS ITS FOURTH YEAR — let's review a few lines from the pages of "the finish line" for 1946.

The four letter word — February, 1946

Some time in the dim, distant past, someone started using a little four letter word starting with "c" to describe mechanical damage to porcelain enameled metal. Another word might have been used just as effectively but the fact remains that the word "----" caught on with technical men, plant men and users of porcelain enamel alike and soon became the accepted term among all who produced or used the material.

It is our suggestion that all those who write or publish papers on enameling subjects use the blue pencil in the future on the four letter word starting with "c" and that those who speak on the subjects do likewise.

Industry research has given us improved products of which we may be justifiably proud but much of the effectiveness of these improvements may be nullified if we continue to assist our competitors in keeping the industry's number one "Bugaboo" alive. What do you say?

What's in a name? — March, 1946

In a name itself — nothing! In the things for which it stands — character, quality, usefulness, service and all the attributes of man or product — a name, a *good name*, means everything.

As a product name, "porcelain enamel" has a heritage in history that is unsurpassed. In its present stage of development "porcelain enamel" gives to scores of metal products an otherwise unattainable degree of beauty, protection and permanence for which we may be justifiably proud. Let's quit worrying about the name and keep our attention focused on increasing the value and service of the product it represents.

The real answer to the value of any product name is in its meaning to the man on the street and the housewife in the kitchen. Our job would seem to be one of continued research and development, resulting in constant improvement of product — plus — a new and greater recognition of the importance of using recognized channels for the education and enlightenment of the ultimate consumer.

An unbeatable team — June, 1946

A powerful combination of organizations, or groups of organizations, is developing along the porcelain enameling horizon.

Comprising the team are the American Ceramic Society (technical), the Porcelain Enamel Institute (business and practical), and the local Enamelers Clubs (strictly practical). It is true that all of these organizations, with the exception of a couple of Enamelers Club groups that are in the planning stage, are not in any sense new. But, we see definite possibilities for closer cooperation between all of the various organizations, cooperating as a team to wield a stronger force than ever before — force that will be of distinct benefit to each of the organizations individually and, certainly, to the industry as a whole.

With wholehearted cooperation between these effective and respected organizations, and with reasonable co-ordination of their activities, we have a force for advancement that can't help being felt throughout our own industry, and a competitive force that will be felt by competing industries as well.

Missing a bet — July, 1946

Disastrous fires cause an annual loss of life in the United States alone totaling approximately 11,000 and property damage ranging from $373,000,000 in 1943 to $455,329,000 for 1945. Fires took a terrific toll on shipboard during the war.

It would appear that the porcelain enameling industry is missing a golden opportunity in its failure to expound the fireproof qualities of all porcelain enameled metal surfaces.

If this story is put over effectively to architects, builders, and to those who buy, the result should be a new sense of security against "flash fires" in future modern buildings and ships, a saving in lives and property and, incidentally, an expanded market for porcelain enamel.

The "all porcelain" refrigerator — August, 1946

Who will be the first among the refrigerator manufacturers to produce that "standard" refrigerator of popular size with *porcelain enameled exterior?*

It is inevitable that some important manufacturer will take this step and build, on a high production basis, a popular "all-porcelain" refrigerator to sell at a price comparable to the present organic finished cabinet. The manufacturer who takes the step first will have a definite head start in the trend to better cabinet exteriors.

Porcelain enamel is the *only* satisfactory finish for the inside of a refrigerator, and it remains the *best* finish for the exterior. The lengthening lifetime of the mechanical units used to power this important equipment needs a "lifetime" finish to make the picture complete. You can mark it down that someone is going to do this job. Who will be the first?

A boon to permanence — October, 1946

Whatever the trend may be as far as specific applications or products are concerned, there are few of us who would question that more and more steel will be used in construction of future buildings of all types. Where metal is used, the problem of finishes is ever present.

Although we have never advanced the idea of "covering the world" with porcelain enamel, there are unquestionably a great many logical applications in the architectural field that have not as yet been given serious consideration by our industry. Where applications *are* logical, porcelain enamel offers the *one and only* protective coating that may be considered permanent in the sense that architects refer to permanency.

Dana Chase

EDITOR AND PUBLISHER

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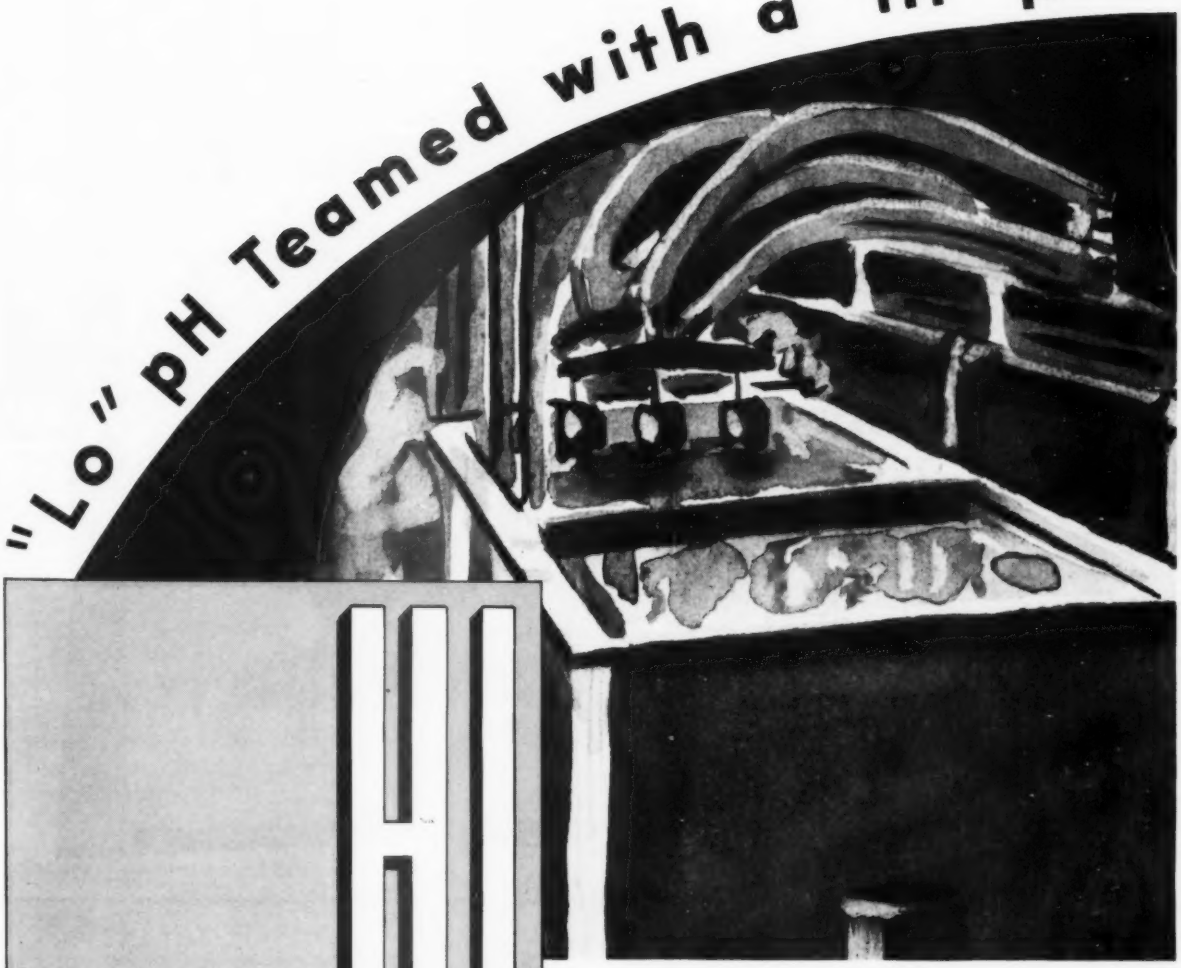
"Lo" pH Teamed with a "Hi" pH



LO-HI pH

"Lo" pH teamed with "Hi" pH

The "Lo-Hi" process of chemically cleaning steel not only removes any kind of soil, but when "Lo" pH is properly teamed with "Hi" pH it can be depended upon to remove free rust . . soften scale and welded sections . . penetrate through rust and seams . . activate surface of ware . . present neutral surface to acid and reduce pickling time – acid concentration, or both.

LO-HI pH

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Start right THIS YEAR with Century

AS you look at your calendar on January first, we suggest that you resolve to investigate the advantages of Century time-proved frits before another month rolls around.

Century has a complete line of time-proved frits for your job, whether it's a heavy steel or cast iron part, or a light gauge, multi-colored sign. You aren't experimenting when you try these enamels — they have all won their service stripes in "on-the-line" production.

There are no more economical frits to buy or to use than Century. In the plant you get smooth, trouble-free operation, the kind your plant men like. In the finished ware you get smooth, durable finishes, the kind your salesmen, and your customers, go for.

Century ground coat enamels have won an enviable position during this period of varied steel supplies — The way to insure an eye-catching, trouble-free finished product is to use Century cover coats too.

You'll start right for 1947 if you arrange for an early trial of these economical, time-proved porcelain enamel frits.

FRIT from CENTURY

FRIT MASTERS

CENTURY VITREOUS ENAMEL COMPANY, 6641-61 S. Narragansett Ave., Chicago 38, Ill.

A completely conveyorized plant

for stove work and jobbing

(see detailed porcelain enameling plant layout pages 32 and 33)

By Gerald E. Stedman

My assignment by *finish* to visit the new porcelain enameling plant of Brown Stove Works, Inc., at Cleveland, Tennessee, was particularly pleasant for, although I have observed many larger, I have never found any plant more efficiently modern. Here, in an overall 100′ x 200′ conveyorized layout, 3,000 ft. per hour, or 4500 lbs., of porcelain enameled ware is being turned out with rejects less than 1 per cent, and with re-work averaging less than 5 per cent. It is a neat operation, proving that highly efficient operation and low-cost production can be achieved in smaller porcelain enameling setups.

Complete facilities for both cast iron and steel

The Brown works covers some 20 acres in Northwest Cleveland, a town of some 20,000 people. It has a 2,000′ frontage on the Southern Railway, and a 400′ private siding with a U flow of production from and to it. The plant is modern, fireproof, brick and steel construction, and contains a well lighted foundry; machine shop; sheet metal fabricating department; porcelain enameling plant; paint department and woodworking setup that stores, dresses and resaws all crating. During the war, some 25,000 space heaters were produced for the Government, as well as many castings for cracking plants connected with the butydiene phases of synthetic rubber production.

Presently, the Brown foundry capacity is 60,000 lbs. of cast iron per day. The plant produces white and black porcelain enameled wood and coal ranges, and a walnut grained porcelain enameled heat circulator line. Porcelain enameling is also handled for outside companies. At the time of my visit, 25 per cent of total porcelain enameling volume was in this classification. Present employment is 300; the plant is presently at 75 per cent production, turning out 300 units per day. A smartly designed line of new gas ranges will reach market early in 1947, tools and dies for which are about finished. Initial production now planned will be 150 units per day.

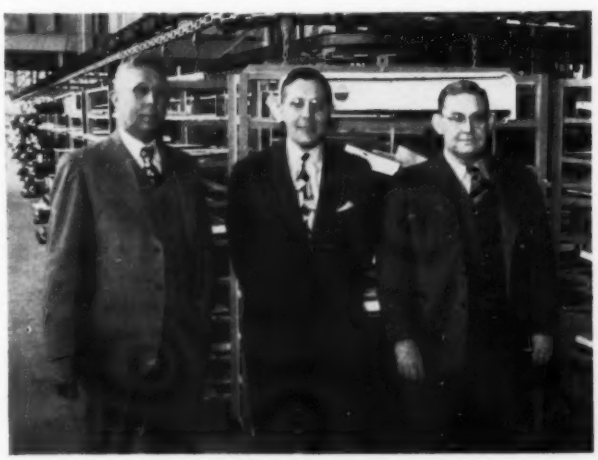
Space and subject limitations will not permit detailing Brown's foundry practice, about 40 per cent of which is machine molding, but I can not resist mentioning that I saw the largest snap mold operation I have ever seen there. The mold is 25″ x 15″ deep and developed without use of boxing; the technique being to put it up in a flask which is then immediately removed.

Fabricating and metal preparation

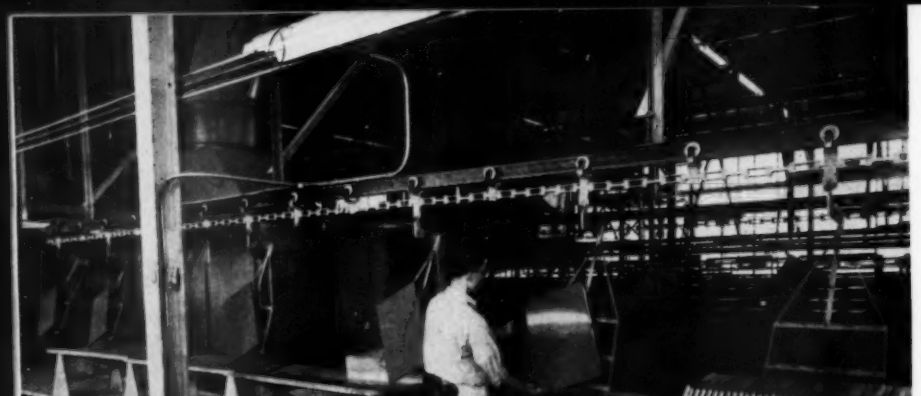
Steel of 16 to 24 ga. moves from siding through a 300′ x 100′ general storage into the Brown steel shop where, in reality, the flow is backward because Brown fabricates far more parts than require porcelain enameling. Equipment here consists of three power shears; one Consolidated 50 T., one Verson 100 T., and one Clearing 300 T. stamping presses; five notching presses; two punch presses, one automatic press brake, three spot welding machines; one large electric seam welder; one power roll; and one seamer. Progressiveness is shown in the use of unit gang punches which, set in master block, permit multi-punching in one lick.

About 400′ north from the storage end of the steel shop Brown has built a new power building which contains a 150 hp. boiler to furnish steam for the enameling plant and heating the entire factory. Though coal is used, much of the fuel is "hog feed" from the resawing mills.

From forming in the sheet metal department, the steel is toted by powered lift-truck and pallet to the pickling bay. This pickling room is 82′ x 18′, accommodated by one T over-



Left to right are Grover C. Brown, president and general manager; Kenneth Brown, secretary and treasurer; and L. L. Harle, general superintendent. Grover Brown has been active in the stove industry since 1909. He started his own company in 1935.



Ground coat dipping. Conveyor fixtures are designed for a variety of parts.

The "utility" spray line handles all finish coat application except white.

From transportation conveyor to cable conveyor, through white coat spray room.

head monorail air hoist. Individual tank dimensions are 8′ x 4′ x 5′. There is plenty of front aisleway. Neutralizer and nickel filters are behind the tank bank. Tanks are arranged in this sequence: No. 1 cleaner, No. 2 cleaner, No. 3 hot rinse, small aisle, No. 4 cold rinse, No. 5 acid dip, wide aisle, No. 6 acid rinse, No. 7 nickel dip, wide aisle, No. 8 nickel rinse, No. 9 soda ash neutralizer, wide aisle, No. 10 borax wash, No. 11 dryer. There is top exhaust from the pickling room. The pickling process is entirely standard and needs no detailing.

A completely conveyorized plant

The work comes from the pickling room into the ground coat area of the main porcelain enameling floor. The distinctive thing about this entire layout is that ware is completely handled automatically by overhead conveyors. Outside of manual transfer from station lines, there is no movement except by conveyor. Toting, trucking, dollying, and carting are entirely eliminated, with the consequent elimination of such hazards as jarring, bumping or scratching damage. That is the main reason for the very low reject record in the overall porcelain enameling operations.

A continuous overhead chain conveyor of approximately 220′ travel accommodates the operative functions of the ground coat application. The end of this conveyor line, nearest the transfer station of the furnace conveyor travel which moves at right angles to it, is 50′ distant from the exit of the pickling room. The pickled ware bank is racked in a 23′ area here, work coming to ground coat dip tank suspended on multihook fixtures, designed to accommodate a great variety of parts in their conveyorized travel to dryer. Literally hundreds of parts come to this ground coat dipping and conveyor line in all sizes and dimensions. The only limit is the dimension that can pass through the dryer door.

Work passes through the indirectly oil-fired dryer which is 8′ high, 14′ wide and 34′ long; travel from dip to dryer being 40′. The work makes a U turn in the dryer. Temperature of this dryer varies from 350° to

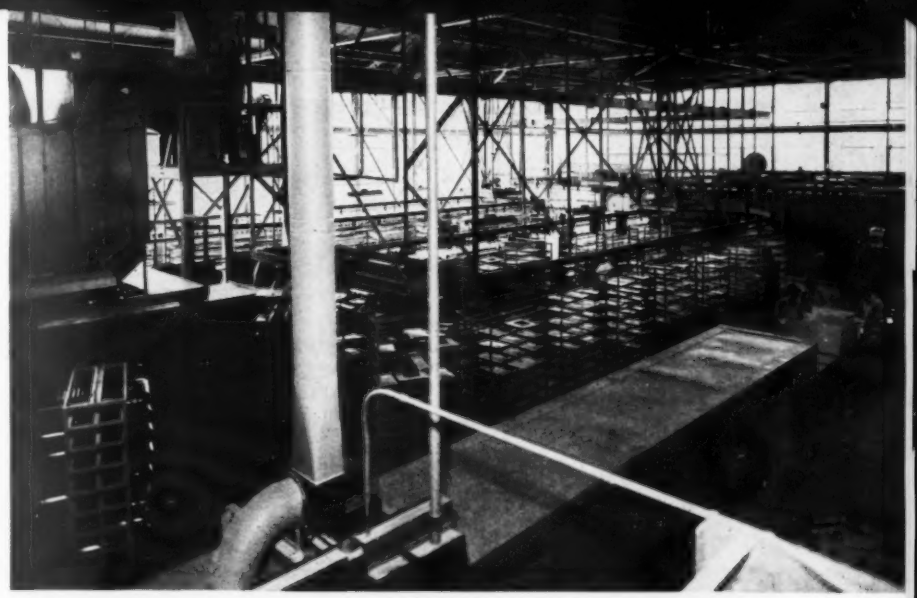
400°. Conveyor travel speed is 15′ to 30′ per minute. The travel time in the dryer is between three and four minutes.

Work then comes to the black edging booth and stipple, on the conveyor's return cycle, and moves finally to the transfer point where the ware is removed manually and placed on the furnace chain. The racks, in their now empty endless travel, return to a washer just ahead of the dip tank and are prepared for the next cycle. The interval between dip and transfer to furnace chain is six minutes. Since all materials, ground and finish coats, are handled similarly from the basement mill room, I will describe that later.

Feed conveyors at right angles to furnace conveyor

The single flow, porcelain enameling furnace, with its attendant conveyor system, is positioned at right angles to the conveyorized line of ground and finish coat flow. The furnace chain is 215′ and moves at 10′ per minute. The furnace is 79′ 6″ overall; 30′ preheat, 20′6″ burning zone, 29′ cooling. It maintains 1570° F. temperature for both ground and finish coats for steel. The furnace is fired by four oil burners, arranged in stagger, side by side. They fire through the arch beneath the hearth and wrap around the silicon carbide muffle. Oil consumption per hour is 25 gallons. The furnace is equipped with Brown controls, is fully automatic, and cuts itself off at any variation involving hazard. The furnace chain is driven by a 1½ hp. motor.

The ware comes from the cycle of the ground coat firing to the overhead utility conveyor. This travel is an L 122′ down and 22′ leg on a chain, which is equipped with utility racks in suspension from it. These utility racks or carriers are 4′ long, 18″ wide, 60″ high and consist of 8 shelves. Construction is of welded angle iron. Space between shelves is 8″. Wood inserts fit into the angles, forming the shelves, to accommodate the carrying of ware without hazard of metal-to-metal contact. Carriers were originally designed for central, balanced suspension. However, so much heavy cast iron was moved over



The brushing ring (center) completely surrounds a 42′ x 12′ brushing area.

Furnace loading stations — ground coat, utility, brushing and finish coat.

A clear view of the transportation conveyor showing type of racks used.

One of three stamping presses in the Brown fabricating department.

them that tipping was an uncontrollable factor. They are now carried by tandem suspension.

Two finish coat spray lines

Along the L leg of this utility carrier travel, the start of two spray lines are positioned: (1) the utility spray line, handling all finish coat color porcelain enameling, and (2) the white finish line.

Both of these finish coat lines have a 112′ travel back to their transfer stations, where the sprayed ware is placed on the furnace conveyor chain for finish firing. These lines parallel each other with an approximate 24′ space between them.

The utility spray line, incorporating a seven cable (5/16″ dia.) conveyor delivery, moves the ground coated ware from utility racks transferred onto its cable bed, through a battery of four standard spray booths, two set vertically in parallel and two set horizontally in staggered position on the line. These are 7′ x 6′ booths. Hand-operated spray guns are used. Cable delivery then takes the ware through the 40′ long, 4′ wide and 4½′ high utility dryer which is electrically heated and of the 90 kw. type. This is a continuous, ribbon-type dryer, firing at 350°-400°. The 112′ cable movement is usually at 15′ to 20′ per minute, though it has variable speed to accommodate the variety of work. The work, out of this dryer, arrives at station for manual transfer to the furnace chain.

The white spray line, using the same cable delivery system, is more complicated. The work passes into a 45′ pressurized spray room (⅝″ static). This pressure is gently outward of such low volume as to cause a handkerchief to flutter gently outward at the ware receiving ports. It prevents all dust and air contamination from soiling the finish white coating. When I visited the plant, spraying was being manually accomplished. By now, however, the operation is undoubtedly fully automatic. The company has had automatic spray equipment on order and expected its delivery the week I was there. Air is injected into this room by duct, having passed through oil filters and over heating coils to make the room temperature comfortable in winter operations. Spray dust is recovered in water washed, down-draft collection chambers. The filter air input system, 33′ x 15′, is platformed aloft. The blower capacity is 36,000 cfm, powered by a 20 hp. motor.

After the automatic spraying of the finish white coat, the work passes within the pressurized room by cable to edging and acid-resisting booths, and then directly into the 90 kw. white coat dryer, whose dimensions and operation are identical with those describing the utility spray line. Aloft, the water wash exhaust equipment serving the spray room is platformed above the near end of this dryer. The ware comes to station and is manually installed on the carrying fixtures of the furnace conveyor chain.

Color and grained parts used extensively

About 40 per cent of Brown porcelain enamelware volume involves color and graining, the rest being white ware. About 90 per cent of the enameling is on steel, the other 10 per cent being cast iron, which is batched and run on weekends. The furnace, firing at a standard 1570° F. temperature for steel, and moving at the same constant speed for both coats, receives ground or finish coat ware simultaneously as it continuously pours from the transfer stations.

At the mouth of the white dryer cable delivery there is an inspection station that transfers work to a shelf rack-type conveyor carrier that travels around a three-bench brushing area 42′ x 12′, where all brushing, rework and repair is accomplished. The inspection area, fronting the dryer, is 15′ long. The brushing tables are enclosed within the continuous travel of the surrounding

to Page 62 →

Forming lubricants

basic treatment of a subject worthy of cooperative study by fabricators and enamelers of formed metal products

By Gilbert C. Close • LOS ANGELES CORRESPONDENT FOR FINISH

Exclusive feature finish

Few phases of metal technology have advanced more rapidly in the past few years than the art and science of metal forming. This is true of punch press, pressure press, stretch press, drop hammer and hydrotel work. There is little doubt that new developments in this field will have considerable impact on the porcelain enameling industry. Many products to be enameled, including washing machine tubs, bathroom fixtures and kitchen utensils, are produced cheaply, quickly and efficiently by one or more of the various metal forming processes.

One of the most important operations during metal forming is proper lubrication of the work-tool contact surfaces to reduce friction, minimize heat, and provide a better flow of metal between the contours of the forming dies or blocks. Until quite recently, data concerning forming lubricants was almost entirely empirical, based on shop observation, experience and results. Selection of lubricants was by the trial and error method. Shop engineers could recognize the symptoms of improper lubrication, but had no dependable yardstick to use in selecting a lubricant to eliminate these troubles.

Today this picture has changed. In recent years, using newly developed laboratory equipment, petroleum engineers have accumulated considerable exact scientific data pertaining to the action of lubricants under pressure, and lubricant characteristics necessary to obtain optimum metal forming results. The one loophole in this new accumulation of knowledge is the numerous variables in the metal forming industry which practically eliminate the possibility of recommending a specific lubricant for a specific type of work. At the same time it has been discovered that a lubricant characteristic highly desirable during one phase of the forming process may be objectionable from other standpoints. Thus, adhesiveness of the lubricant to the metal surfaces during forming, important in securing optimum lubrication, becomes objectionable during subsequent cleaning of the metal, as an adhesive oil or grease is very hard to remove.

Variables affecting choice of the proper lubricant

The most important variables which afflict the metal forming industry and demand varying characteristics of forming lubricants include the type of metal to be formed, its gauge, forming speed, type of tool employed, the degree of forming necessary, and the importance of complete removal of all forming compounds prior to subsequent operations.

Insofar as the enameling industry is concerned, the variable of different metal types is eliminated (under normal conditions of supply), but the complete removal of all compounds after forming and prior to application of the ground coat becomes of paramount importance. Thus, at the very start, some highly successful forming lubricants, including graphite greases, must be eliminated, as the solidified particles of graphite enter the pores of the metal and are almost impossible to remove. Also, many of the new-type, high-pressure greases are unuseable for similar reasons.

How can the proper lubricant be selected?

How, then, can the shop superintendent, faced with numerous variables each of which may alter necessary lubricant qualities, select a lubricant with any assurance that it will meet his requirements? There is but one logical answer. He must acquire for himself a basic knowledge of lubricants, lubricant characteristics, and how these qualities can be juggled to obtain best overall results in his own particular forming problems.

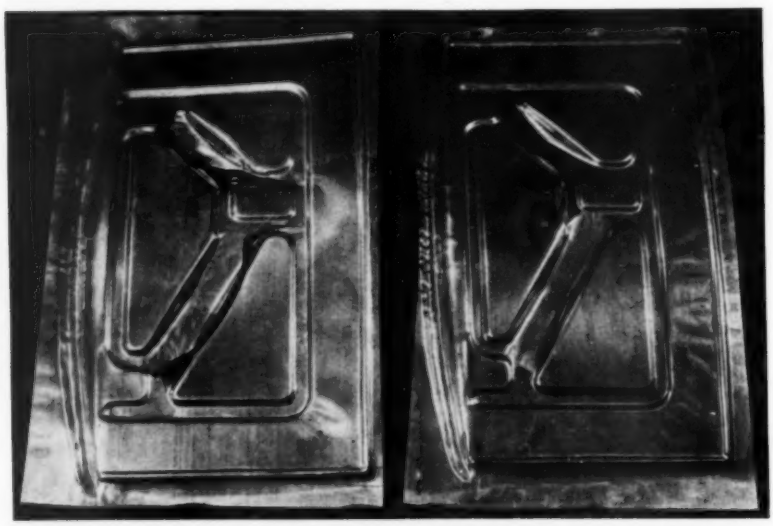
It is almost an ironclad rule for enamelers to demand soap-type lubricants for their work. This is because these lubricants are relatively easy to remove by conventional cleaners. There is some agitation toward use of straight mineral lubricants and degreasing equipment in cleaning. As will be pointed out later, straight mineral oils may fail miserably as a forming lubricant, and not from the cleaning angle. It should be kept in mind, however, that even straight soap-type lubricants are highly variable products, and that various desirable characteristics may be accentuated to almost any degree. It is the purpose of this article to discuss specific lubricant characteristics in an endeavor to furnish a yardstick for actual shop tests and proper selection.

Prior to detailing desirable lubricant properties, it is necessary to become acquainted with terminology used by petroleum engineers in conjunction with these properties. *Fluid friction* is the friction encountered when two solid surfaces are entirely separated by a viscous film of oil; *solid friction* results when the oil film breaks down, permitting metal-to-metal contact. In forming work, fluid and solid friction may exist side by side during processing of a part.

The importance of "boundary lubrication"

Bridging the gap between fluid and solid friction, we encounter

boundary lubrication. The development of a forming lubricant that will provide optimum boundary lubrication is the principal goal of petroleum engineers. Theoretically, boundary lubrication is provided by an oil film only a few molecules in thickness, and so attached by atomic linkage to the metal surfaces that it assumes many aspects of a solid. Such a film is described as being "adsorbed" on the metal surface.



Drop hammer formed .025 gauge sheet iron. When forming sheet at left, a thin, straight mineral oil lubricant was employed. Sheet at right was formed employing a grease-type lubricant incorporating an organic lubricant in the form of a calcium soap.

In machine and motor lubrication, the viscosity of an oil, that is its ability to maintain a viscous film that completely separates the solid surfaces, is most important. However, no oil or grease is sufficiently viscous to resist breakdown by the extreme pressures used in metal forming. After this breakdown, the molecular adsorbed oil film takes over to provide boundary lubrication. The inherent slipperiness of adsorbed oil films is a measure of oiliness, thus oiliness of a lubricant assumes importance over viscosity in all types of forming work. Despite the viscosity of the forming lubricant employed, its oiliness under boundary lubrication conditions is the true measure of its value as an anti-friction agent during forming operations. At the same time, as will be noted later, formation of too tenacious an adsorbed film may be undesirable from other important production standpoints.

Ten desirable properties of a forming lubricant

In brief enumeration, the ten most important desirable properties of a forming lubricant are: (1) slipperiness or oiliness; (2) film strength; (3) heat resistance; (4) low cost; (5) ease of removal; (6) spreading power; (7) adhesiveness; (8) stability under storage conditions; (9) low corrosive tendencies; and (10) minimum deleterious psychological and physical effects on the user. It will be noted immediately that certain of these characteristics are of conflicting nature. However, comprehension of how each expedites metal forming and its relative importance in producing good work with a minimum of rejects will aid materially in the final selection.

Oiliness

As previously indicated, oiliness is the measure of the anti-friction value of a lubricant when acting under boundary lubrication conditions. The importance of reduction of friction between the tool and work in any forming operation is readily apparent. When using a lubricant with good oiliness properties, less power is required, and the work slides freely over the metal forming surfaces, eliminating centers of excessive pressure and resultant high temperatures. Such high temperatures will cause breakdown of even adsorbed films, thus allowing solid friction between the tool and work. Solid friction is the principal cause of scored and torn work, and in many cases will cause severe fouling of the tool. Thus, if numerous rejects are being produced due to deep surface scores, excessive metal thinning, or actual rupture of the part, it is logical to suspect that the lubricant being used is lacking in optimum oiliness properties.

The slipperiness of a forming lubricant is determined by two specific conditions — its inherent oiliness, and the coefficient of friction between the metal surfaces involved. Remember that an adsorbed oil film is only a few molecules in thickness. Therefore, any surface irregularity of the metal, either work or tool, and though it may be microscopic in size, will affect the amount of friction encountered.

Mineral oils used alone have poor oiliness properties. On the other hand, most animal and vegetable oils exhibit a high degree of oiliness. When even a small amount of animal or vegetable oil is added to a mineral oil, the oiliness properties of this compound are vastly improved. The more commonly used organic oils employed as additives include castor oil, palm oil, tallow or lard. It is true also that additions of animal or vegetable oils improve cleaning characteristics as, in conjunction with an alkaline cleaner, they are reduced to soaps.

The explanation of why animal and vegetable oils exhibit better oiliness than the mineral oils is somewhat complex. Mineral oils are termed "saturated hydrocarbons," which means that the atomic linkage tendencies of each oil molecule is completely satisfied, and there is no tendency for the molecule to link itself with the metal surface, thus forming an adsorbed film. On the other hand, the atomic linkage tendencies of animal and vegetable oils are not satisfied, and when pressure brings them in close conjunction with a metal sur-

face the unsatisfied tendencies link with the metal molecules and an adsorbed film is formed. It is thus apparent that an adsorbed oil film is, theoretically, the first stage of direct chemical combination between the oil and the metal itself.

This theory is supported by the fact that as adsorbed oil films become more tenacious they become harder to remove by conventional cleaning methods. In fact, very highly tenacious adsorbed films may actually etch the metal surface, proving that a certain amount of direct chemical combination is taking place. It is thus apparent that the oiliness characteristics of a forming lubricant should be limited to exact requirements. When good work is being produced which at the same time is difficult to clean or exhibits a slightly etched surface, it is logical to suspect that the oiliness of the lubricant being used, that is its tendency to form an adsorbed film, is too great for the operation involved. Perhaps a lubricant with slightly inferior oiliness properties will produce equally good work minus these deleterious effects.

Of late, chlorinated and sulphurized mineral oils have been becoming increasingly important in conjunction with high pressure work. To explain the action of these oils, we must return again to the molecular structure of the oil itself. As previously noted, a molecule of mineral oil has no tendency to link other molecules because of satisfied atomic conditions. But when chlorine or sulphur is added to the mineral oil molecule, the linkage characteristics of neither chemical is completely satisfied. Thus, when a chlorinated or sulphurized oil or grease is brought in close conjunction with a metal surface, it is the unsatisfied tendencies of the chlorine or sulphur which link with the metal molecule, acting as an anchor to hold the oil molecule in place. In fact, this linkage may be strong enough to result in partial chemical combination, thus producing a slightly etched surface on both work and tool.

Film strength

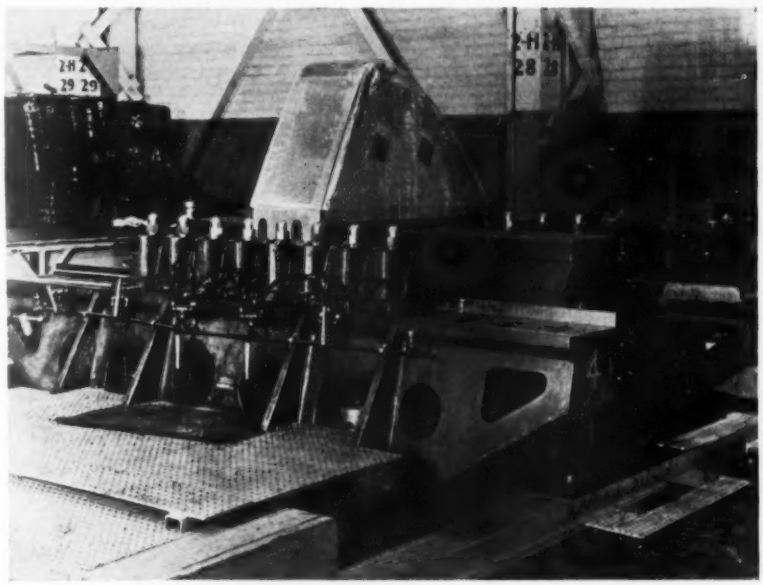
The oiliness properties of a lubricant would be practically useless in pressure work without sufficient film strength to prevent film rupture and solid friction. Fortunately, those properties which are productive of good oiliness also contribute to film strength. Film strength results from inter-molecular forces acting between the lubricant molecules themselves, and between the lubricant molecules and the molecules of the metal to which the film is attached.

In studying the analysis of a forming lubricant prior to purchase, it should be noted whether the lubricant contains additives that will contribute to oiliness and film strength characteristics. These additives may be listed as an organic substance such as tallow, lard, palm oil or oleic acid, and again may be listed as a calcium, sodium, potassium or aluminum soap. When listed as a soap, it is evident that the additives have been compounded with the lubricant in a combined form that will expedite subsequent removal.

In conjunction with formed products to be porcelain enameled, exhaustive tests should precede the purchase of large quantities of either chlorinated or sulphurized oils, or of the new high-pressure lubricants now appearing on the market. As previously indicated, the adsorbed film produced by these lubricants may be very difficult to remove to the extent required for successful enamel application.

There are certain types of non-oily solid substances which, when added to a forming lubricant, may impart a degree of apparent oiliness and film strength attained by purely mechanical characteristics. These solids are called "fillers," and include chalk, fireclay, potter's clay, soap-stone and mica. It is considered by theorists that these solid substances act to prevent metal-to-metal contact, thus providing a microscopically thin space between the metal surfaces in which an oil film may persist in a continuous and relatively unstressed form.

Insofar as enameling is concerned, the main objection to filler-type lubricants is that the solids employed may enter the metal pores under pressure and be difficult to remove by alkaline cleaning or furnace scaling methods. This is particularly true of graphite solids. The only dependable guide in this case is exhaustive tests in the shop where the lubricant will be used, carrying the tests completely through the forming, cleaning and enameling



The stretch press, perfected and exploited during the recent war, may find use in the enameling industry for forming architectural units. Pressure is applied to stretch the metal into configuration with the form block. When stretched beyond its elastic limits, any tendency for "spring back" is eliminated. Subsequent annealing will remove internal stresses.

cycles. The appearance of the finished work, and its freedom from dirt-induced defects, will tell the complete story.

Heat resistance

Forming lubricants vary markedly in their resistance to heat. Some will lose their oiliness and film strength properties at much lower temperatures than others. At the same time, heat resistance is closely associated with oiliness and film strength properties. More specifically, good oiliness and film strength characteristics will delay lubricant breakdown, thereby preventing metal-to-metal contact, which in turn is highly productive of high temperatures.

Extensive and very complex investigations have revealed that certain types of severe forming operations are productive of very high temperatures throughout high pressure forming areas. A lubricant that would break down at these temperatures would only add to the problem by permitting solid friction to occur.

There are maximum temperatures at which any lubricant available will break down, but this does not mean that nothing can be done to remedy the situation. By using an additive that will increase the oiliness of the lubricant, friction will be reduced with consequent reduction of temperature. Working in this direction, and insofar as enameling is concerned, the only limit seems to be when the oiliness of the lubricant forms an adsorbed film that can not be removed by conventional cleaning methods.

Low cost

As with many processing materials, the cost of a forming lubricant implies much more than the price paid the manufacturer of the lubricant itself. In many instances, a lubricant of high initial cost will permit production shortcuts that will substantially lower overall production costs. With a low-cost, cheaply compounded lubricant, three press operations may be necessary to produce a part, while with a slightly better and more costly lubricant two press operations may produce the same results.

Also, many lubricants require mixing just prior to use, and this in itself takes time. Some lubricants may be dabbed on a product and depended upon to spread over the entire surface during forming, while lubricants without good spreading power will have to be applied over all surfaces prior to the press operations. The effect of the lubricant on the tool surfaces is also important. While quick removal from the product may prevent corrosion, tools operate for

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PHOTOS COURTESY NORRIS STAMPING & MFG. CO.

The importance of the forming lubricant in a drawing operation of this type can not be overemphasized. In this instance a soap-type lubricant is used for the forming of bathtubs.

The value of good housekeeping

cleaning up dirt is janitor work — preventing disorder is management

(from a paper before the 1946 P.E.I. Forum)

By J. S. Le Munyon • ASSISTANT PLANT SUPERINTENDENT IN CHARGE OF MANUFACTURING, TAPPAN STOVE COMPANY, MANSFIELD, OHIO

SINCE we all realize there is value in good housekeeping, this article will show our method of practicing and accomplishing cleanliness and orderliness and some of the results obtained in the Tappan plant.

We believe: **1.** That carelessness is the main cause of poor work, and that the first sign of carelessness is dirt and disorder.

2. That dirt is always evidence of waste, either of material or of mental and physical energy, or both.

3. That cleaning up a lot of dirt and disorder is *janitor work*, but preventing this disorder is *management*.

4. That if you can't manage the order of your department, you can't manage your department.

5. That if you are working in dirt and disorder your costs are higher than they should be.

Tentative plant orderliness organization formed

When we first organized and developed an orderliness program we formed a committee, consisting of three members from management and three members from the employees in the factory, that drew up the following tentative plan for accomplishing our objective.

1. Place responsibility of clean-up on department heads.

a. Issue map, indicating territory each department head is responsible for.

b. Issue instruction sheet, specifying rules and regulations with respect to keeping each territory clean.

c. Make weekly follow-up inspection of all departments and super inspection monthly with member of top management.

2. Management to meet with responsible department heads.

a. Explain program in its entirety, definitely making this a part of every department head's job equal to that of getting out production.

b. Letter to entire personnel containing complete information concerning this permanent program.

c. Give letter of explanation and details of rules and regulations to all new employees.

d. Provide adequate waste cans, properly located bottle boxes, and provide for their regular service and maintenance.

e. Provide adequate signs, properly located, for instructions.

f. Provide the utmost in washroom conditions — proper equipment, sanitary conditions, correct care.

Assignments for departmental foremen

"You are to accept the responsibility of securing the utmost in orderliness in your department according to the following plan. It is further urged that you treat this assignment from day to day in a manner equal to that of any other assignment you may have."

1. Department heads are responsible for complete orderliness of their assigned territory, excluding established aisleways and unusual spots assigned to the plant protection chief. In complying with this rule it is hereby ordered that each foreman assign the entire personnel of his department the responsibility of keeping his assigned territory orderly by strictly enforcing the following rules:

a. Work of orderliness shall be equally divided among all personnel.

b. Employees shall thoroughly clean machines, benches, or any other equipment upon which they are working or have worked during the course of the day.

c. Employees shall put in proper order and location all tools and unused material with which they are working or have worked during the course of the day.

d. Employees shall thoroughly clean all immediate working space and all space not assigned to janitors.

e. Employees shall place all waste materials resulting from such cleaning in proper waste containers.

f. Employees shall place all bottle caps, paper bags, candy wrappers, garbage and all other refuse in proper waste containers and at all times refrain from throwing such waste on the floor, in stock boxes, kegs, etc.

g. Employees shall place all milk, coffee and soft drink bottles in correct containers immediately following their being emptied of contents.

h. Employees shall at all times keep established aisleways clear of of trucks, boxes and all other equipment or storage material. To further clarify this point, it is hereby ruled that storage must always be at least two inches back of any established aisle line to permit repainting of lines at any time, and that all such storage shall always be kept in neat order.

2. Any violation of plant orderliness rules passed on from a preceding shift becomes the full responsibility of the succeeding foreman or supervisor who accepted the condition when taking over. It therefore becomes his responsibility to clean up the condition immediately.

3. Equipment or material placed in a territory for storage becomes the responsibility of the person responsible for that territory.

4. Scrap material now scheduled for direct removal by outside concerns and all similar materials in future are to be removed each Tuesday and Thursday. Control of such removal is the direct responsibility of the salvage department.

5. Scrap material not scheduled

This view of ground coat dip tank and the entrance end of ground coat dryer shows clean racks and drain trays for ground coated parts.

for direct removal must not be permitted to accumulate in departments but shall be directed to salvage department for segregation and removal.

6. Material or equipment shall not be delivered to a territroy unless the person in charge of that territory has been consulted for acceptance and proper space for its storage has been provided.

7. Storage space for any new or unusual material or equipment that is not now provided or any change of present storage space shall be referred to the plant protection chief.

8. Employees assigned to a temporary job in a department other than their own are responsible for any disorderliness they may have caused and must be instructed to follow all plant orderliness rules in correcting the condition.

Plant orderliness committee

Purpose: To supplement the plant orderliness program by providing opportunity for employees' participation in planning, grading and enforcement of the program.

Membership: The plant orderliness committee consists of six members — three from the employee ranks, three from management.

Assignment: The members make monthly inspection tours through all departments, using a grading system to determine the orderliness status of each department.

Each department, for perfection, may receive a grade as high as 100 points. However, each committee member uses a score card and for each misplaced article or condition of disorder five points are deducted from the top score of 100 points. Following the inspection tour, each score card is analyzed and the score for each department is tabulated. This goes into a summarized management report.

The most orderly department is publicly recognized by use of a large bulletin board located at the main employees entrance. Congratulatory messages, changing from month to month, are placed there for all to see.

The most disorderly department is publicized simultaneously in the same manner, except that their position is strongly ridiculed.

Special equipment for enameling department

Along with the above program, when installing our own enameling plant in 1939, one of the factors taken into consideration was what equipment we might install to help eliminate dust and dirt in this department.

In the pickle room we installed fans above the tanks with enough capacity to change the air in this room 30 times per minute, thus removing the fumes and steam, and keeping the room in a dry condition.

In the mill room the enamel is pumped directly from mills into enameled steel tanks with tight covers, placed on mezzanine floor, and brought down by gravity into pressure or dip tanks through Rotospray and magnetic separator.

Ground coat dip tanks are made of stainless steel and equipped with recirculating system to eliminate the possibility of rust contamination.

All white coat spraying is done in a plenum chamber where incoming air is filtered and the room kept under pressure. The ware enters the dryer where it is transferred from spraying conveyor to dryer conveyor by means of double sheaves, eliminating the travel of spray conveyor through dryer.

All spray booths are water wash type with stainless steel water tanks.

All cover coat spraying is done in a plenum chamber. Even though all air entering the chamber is filtered, the exterior is also cleaned regularly.

Brushing tables are exhausted through a water wash unit.

Fresh air is taken into building through oil filters at the rate of 30,000 cubic feet per minute. This is approximately 2,000 cubic feet more than is exhausted out, which puts this room under slight pressure.

Cleaning of equipment and floor sweeping is done with a heavy duty portable vacuum cleaner; brooms or brushes not being permitted.

Equipment cleaned weekly

One man is assigned the responsibility of cleaning the equipment at least once each week, and has a schedule that reads something like this:

Sunday — Clean recuperator filters and ducts that furnish waste furnace heat to dryers, furnace air seal filters, top of furnace, preheat zone, furnace chain, shoe plates, drop rods and track.

Monday — Off

Tuesday — Clean air supply room (that furnishes air for plenum chamber) inside and out.

Wednesday — Clean top of plenum chamber and filtered air unit for brushing table area.

Thursday — Clean brushing table water wash screen and tops of spray booths.

Friday — Clean ground coat dryer (inside and out), conveyor chain and track.

Saturday — Remove ducts and clean cover coat dryer inside and out.

Daily operations

Mill room operators gather up all reclaim enamel, both ground coat and white, from spray booths at end of each shift and return it to the mill room to be processed daily. (Sumps and water wash tanks are cleaned out each week.)

Rejects and wash-off ware are rerun daily by having sufficient help in each group to get ware ready. Group incentive rate is based on good ware only.

Entire dry floor space is cleaned by vacuum twice each day.

Pre-war, each employee in the enamel department was required to wear white uniforms. The company furnished the first ones, and made additional ones available at cost. Because of the scarcity, this policy is not in force at the present time.

The Tappan porcelain enameling plant shows desirable department cleanliness. Vacuum cleaner in the foreground replaces brushes and brooms.

The money value of good housekeeping

Our records show that janitor service is at a minimum of nine janitors, covering 225,000 sq. ft. of floor space — or one for each 100 employees.

How do we know it pays to be orderly?

Accident rate reduced by 50%.

Loss and waste reduced by 47%.

Absentee record of 2.5% against industry's average of 5.9%.

Labor turnover less than 1%.

Efficiency increase of 15% average for the entire plant and 18% in the enameling department.

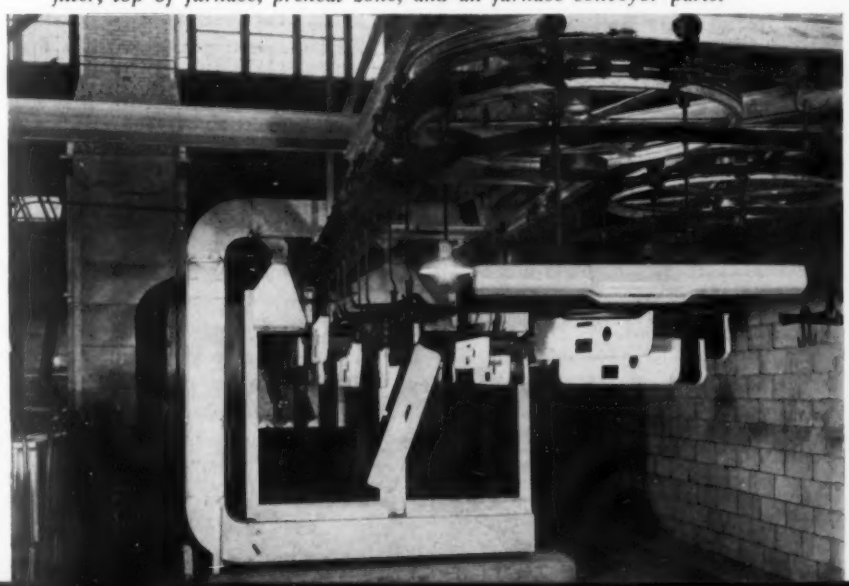
Enameling department turning out 50,000 sq. ft. of fired ware that was planned and laid out for 25,000 sq. ft. per day.

Reclaiming approximately 80% of our cover coat enamel and 90% of our ground coat that does not go on the ware.

To us, these figures are conclusive. The result is greater production of better goods at lower costs and increased prosperity all around.

But remember, each employee should be sold on the idea that he is to keep whatever he is working with clean and orderly.

Sunday's cleaning job includes recuperator filters and ducts, furnace air seal filter, top of furnace, preheat zone, and all furnace conveyor parts.



Discussion of porcelain enamel defects

sixth and final article of a series on drying and firing procedure

By Professor A. I. Andrews • ASSOCIATE EDITOR

ALTHOUGH the causes of many of the material and process defects in porcelain enamels find their sources other than in firing, it is in this last operation that most of them develop. If the enameler were given an iron which did not give off gas (hydrogen) during the firing operation and a good enamel properly prepared, many of these defects would disappear. Such defects as blistering, boiling, fishscaling, reboiling, copperheading and, to some extent, poor adherence are caused by gassy metal. Poor surface preparation of the metal, and contaminating impurities may contribute to a minor extent, but these are factors which can be controlled. So long as the enameler must compromise by using steel which gives off gas during firing, these defects will occur.

The causes of warping, hairlining, breaking and crazing must be shared by the metal, the design, and improper processing.

Tearing, scumming, poor gloss, color, and reflectance; crawling, scale, dirt, and certain crazing in cast iron enamels are enamel and enamel processing defects.

Metal defects

Boiling and reboiling are common to all sheet steel enameling and, if not excessive, the resulting enamel coating is satisfactory. It is when these phenomena are excessively violent and large bubbles are involved that serious defects such as blisters, copperheads and reboil spots in cover enamels develop. A blister is a large bubble at the surface of the fired enamel. In cases where an isolated blister forms it may be caused by contamination by foreign material.

When large bubbles involved in primary boiling burst they may expose the iron under the enamel coating to the oxidation of the furnace atmosphere. At these high temperatures iron oxide forms rapidly and as it reacts with the enamel glass it forms a slag. This slag forms dull reddish brown spots in the fired enamel which are called copperheads. They do not cover well with the cover enamel and are an indication of either bad iron or an improperly prepared metal surface. Some enamels tend to copperhead worse than others. If either blistering or copperheading occurs in the same area on both sides of a sheet, the cause is unquestionably in the iron.

Author's Note:

This presentation was designed primarily for the man returning to the industry after several years of war. It has only touched the high spots of the subject as much more time could be devoted to it. The furnaces and equipment used in firing were purposely omitted as they are so well and adequately covered in the literature.

Fishscale is a defect in sheet iron enamel where a small fracture or particle of the fired coating literally jumps from the surface. The fractures are half moon shaped particles resembling in appearance the scales of a fish. Fishscale is a ground coat defect, but occasionally the defect occurs after the cover coat is fired. Although many causes for fishscale are listed in the literature, it is actually caused by hydrogen evolved from the steel during or after the cooling of the ware. The hydrogen gas develops great pressure and pops off small flakes of enamel. Some steels evolve so much hydrogen that they can not be successfully enameled.

A good enamel bubble structure aids greatly in preventing fishscale. It is therefore not surprising that overfiring which destroys the bubble structure promotes fishscaling. Underfiring results in fishscale as the enamel coating under these conditions is mechanically weak. The character of the enamel glass and the thickness of application influences the tendency to fishscale. The fishscales are small and readily formed with thin enamels, and large and not so numerous with thick coatings. The choice of a bubbly clay is the best means of controlling fishscaling. Clear clays promote fishscaling. The firing time and temperature and the steel should be checked with any appearance of the defect.

A simple method for testing the amount of primary boiling and the reboiling of a steel is the following [1]: A strip of steel one inch wide and six to seven inches long is prepared for enameling and the enamel applied and dried. Using a gas burner and heating from the under side at one end, the primary melting, the primary boiling and the fusion of the enamel on the steel can be observed as the heat spreads along the strip. By using a fired piece the same test can be used for observing reboiling.

The phenomena involved in the adherence of enamels is still shrouded in uncertainty. Many theories have been advanced but most of them have been discredited and none have been proved true. There is, however, much evidence that adherence is related to the metal, its surface and oxide forming behavior, the gas evolution and the composition of the enamel.

No satisfactory method has been developed for testing adherence, as the results of available tests are very difficult to interpret. In general, the enameler considers that slivers of enamel should adhere to the metal when the enamel is broken by striking or deforming the piece. This kind of an adherence test aids in determining the proper firing times and

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Fourteenth annual meeting

of cooking and heating appliance manufacturers

greatest attendance and largest exhibit in history of Institute

THAT the manufacturers of cooking and heating appliances are on their toes was evidenced in the record-breaking attendance (over 600) at the fourteenth annual meeting of the Institute of Cooking and Heating Appliance Manufacturers held at the Netherland Plaza, December 2, 3 and 4.

Many comments were heard on the phenomenal growth of the organization under the capable leadership of Sam Dunckel, managing director, and Mrs. Dunckel, Institute secretary, coordinating the work of a strong group of officers and trustees comprising leaders from all sections of the industry. Each division of the organization has its own active group and presiding officer to facilitate the coordination of business pertinent to individual group activity.

Exhibit expanded

The exhibit of materials and products used in the stove industry was greatly expanded this year, with a definite increase in the number of exhibitors and with many of the previous exhibitors showing more extensively.

Several exhibits related to the porcelain enameling industry were included. They were: Porcelain Enamel Institute, American Rolling Mill Company, Ferro Enamel Corporation and O. Hommel Company.

Merchandising comes to forefront

Several of the principal speakers on Tuesday's general program pointed up "merchandising" as the important topic for future consideration, once production problems and supply channels are cleared.

Henry H. Morse gave the annual president's report to the members. *(See "The Approach of a Buyer's Market" in this issue.)* Fred Lazarus, Jr., president of Federated Department Stores, presented a clear picture of what is ahead in retail merchandising in his presentation, "Business Outlook for 1947." John Bess, executive vice president of Estate Heatrola Division of Noma Electric Company, presented his thoughts in a talk entitled "Appliance Selling in 1947." *(See condensation of his speech in this issue.)*

Labor and raw materials discussed

G. F. Gamber, director of industrial relations, The Crosley Corporation, gave an interesting talk under the title "What's Ahead for Labor." One interesting illustration he cited was a contract for 1946 for one labor group which gives a cost of living bonus instead of a raise in base pay, this cost of living bonus to be affected by the index of living costs. He also quoted from a "Mill and Factory" survey covering the efficiency of factory labor. The comparison was drawn between the postwar and prewar efficiency of labor. The figures quoted were: 55% less efficiency than prewar; 35% no better than prewar; and 10% better than prewar.

The stove men listened intently to R. C. Todd, administrator of sales, American Rolling Mill Company, whose subject was "Current Sheet Steel Supply and the Future Outlook." Mr. Todd's talk, illustrated with charts, showed the shifting production situation in the steel industry since prewar. He explained how considerable capacity had been eliminated from the market, such as, for example, the elimination of 1,000,000 tons of sheet capacity, through direct purchase by individual users; and outlined plans for expansion by a number of companies. His talk served as an answer to the present critical situation in enameling sheets. Said he, "All is not dark," as he referred to new capacity that would be in the picture during 1947 and early 1948.

On the basis of the information given, it is estimated that the second half of 1947 should see the steel industry "back in stride" unless there are other interruptions in production, such as caused by the recent coal strike, to defer the return to normalcy.

Remarkable choir featured

Social highlights of the general meeting were the President's Reception of ICHAM, and open house at both Robertshaw Thermostat and Merchandise Mart suites.

In addition to professional entertainment provided for the dinner guests, a remarkable presentation was given by the University of Cincinnati mixed choir, comprising 150 voices. Their program brought the entire assemblage to their feet in ovation.

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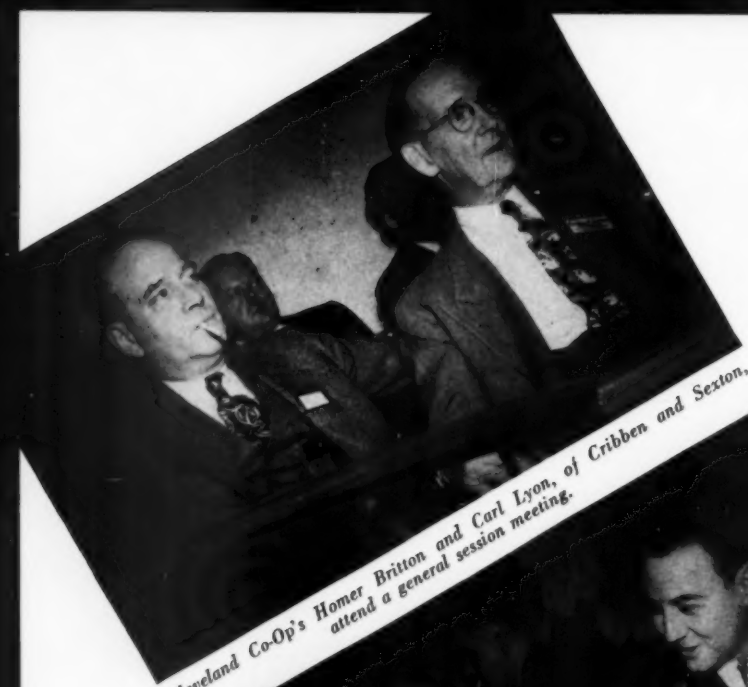
New ICHAM Officers

President: M. F. Cotes, Duo-Therm Division, Motor Wheel Corporation, Lansing, Michigan
Vice President, in charge of Publications: Stanley E. Little, American Stove Company, Cleveland, Ohio
Vice President, in charge of Memberships: Neil H. Cargile, Allen Manufacturing Company, Inc., Nashville, Tenn.
Vice President, in charge of Conventions: Albert M. Kahn, The Estate Heatrola Division, The Noma Electric Corp., Hamilton, Ohio
Secretary-Treasurer, Chairman of Finance Committee; Jennings R. Gordon, Southern Co-Operative Foundry Company, Rome, Ga.
Chairman of Executive Committee: R. T. Frazier, Cavalier Corporation, Chattanooga, Tenn.

SNAPSHOTS



Cleveland Co-Op's Homer Britton and Carl Lyon, of Cribben and Sexton, attend a general session meeting.

W. B. Ruthart, Keeley Stove, and Nathan Klein, Calor[illegible] pre the President's banquet.

Marc Resek, of Perfection Stove, enjoys a luncheon get-together with Prefex Corporation's Charles Campbell.

John Bess, Estate Heat[illegible] in Div. of Noma Electric [illegible]ey Co speaks to the stove m[illegible]

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Robertshaw Thermostat's E. J. Horton gets appreciation from J. L. Gabris, (Robertshaw) and C. M. White, of Philco.

A representative from Canada is W. K. White, Findlay's Ltd., Carlton Place, Ontario.

Athens Stove Works was well repre[illegible] sented at the Stove Meeting by F. O. Mahery, Jr., and Ra[illegible] mond Arledge.

Kenneth plains Corp.

STOVE MEN

Calon[illegible] president, M. F. Cotes, and retiring president, Henry Morse, share honors at the President's dinner.

The beaming smiles are from Mrs. Ed Priest and Charles Russell, of Thermo Gas Co. Russell is president of the Liquefied Gas Association.

e He[illegible]t in "mid-speech" is ectric [illegible]ey Corporation's G. F. tove m[illegible] Gamber.

H. A. Halvorson, Lindemann & Hoverson, is flanked by K. K. Jenson, of Prentiss Wabers, and R. J. Farrell, Sears Roebuck.

Here we see Crosley Corporation's Paul A. Ryan, George J. Lewis, of the Furniture Mart, and John Lynch, of Southern Aircraft.

Kenneth Brown, of Brown Stove Wor[illegible] explains the proposition to Bo[illegible] [illegible]rcer, of Monitor Equip[illegible] [illegible]l Corp.

Armco's administrator of sales, R. C. Todd, outlines the steel situation.

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The approach of a buyer's market

excerpts from the president's annual report to ICHAM

By Henry H. Morse • VICE PRESIDENT, FLORENCE STOVE COMPANY, GARDNER, MASS.

WE are fast approaching the time — it is hard to tell how fast — when we shall find ourselves in a buyer's market. It is possible that with a change in the political complexion of the country, a temporary spell of optimism in the stock market and a breathing spell due to the abolition of OPA, the downward trend may be postponed by several months, but it is on its way, its advent seems certain and it should not catch us unprepared.

No bells or trumpets

When it comes, it is going to seem strange to many of us when we first realize that we can't allocate our production with the certainty that the dealer will accept it without question and discount on the tenth of the month. It is going to hurt our feelings to have buyers look at our merchandise and make suggestions for improvement, or tell us that the prices on our better models are too high and the quality of our low-priced items isn't good enough, but we are heading for this situation and probably rapidly, and the one thing certain about it is, that no matter how much circumspection we may use, it will surprise us when it comes. *Trouble does not ring a bell or blow a trumpet to warn us of its approach.* Portable radios, table lamps, floor lamps, baby carriages, overstuffed furniture and numerous other commodities are already in a market where the buyer, not the manufacturers, calls the tune.

In our own industry we have been making gas ranges, some of you at least, in big quantities, and although we have not yet supplied the demand, we may soon find that the pressing demand has been supplied and the only demand that remains is that fairly constant demand which will take our goods provided they offer more for the dollar than the goods of the furniture manufacturer, the automobile manufacturer, the maker of fur coats and the vendor of trips to Florida. In other words, as soon as the present insistent demand is satisfied, whether it be January or next July, we shall be in competition with every one else who is trying to get a share of the consumer's dollar, and we shall get our share only if we offer more in style, quality, performance and general desirability than the people in other lines of business. It doesn't matter whether this happens in 1947 or is postponed until 1948.

Retailers are cautious

The leading retailers of the country are more keenly aware of this situation than many of the manufacturers seem to be, and definitely time it for the near future. P. A. O'Connell, at the 18th Conference on Distribution, said: "If the consuming public should decide to limit its purchases to necessary goods by reason of the fact that prices are too high, inventories would present a serious problem. Many concerns are canceling orders on overdue deliveries, while others are showing a strong intention not to stock up beyond what is considered their ability to dispose of goods without taking a loss. Sales will continue to show increases during the remainder of this year but after the first of the year greater consumer resistance may be expected. It will not be so much a question of getting merchandise as it will be that of getting customers."

As long ago as October 29, Jack Strauss, president of R. H. Macy Company, told his stockholders that Macy had adopted an extremely cautious buying policy as consumer goods became more available. Mr. Strauss said that goods of improved quality were becoming available, and the surge of indiscriminate buying was over, and he emphasized the inherent danger of anything but a conservative course under conditions prevailing even at that time.

It is reported that in Warren, Ohio, General Electric sent 200 vacuum cleaners to supply a demand for 350 and had to call 125 people who had left their names before one vacuum cleaner was sold.

The "other side" of the picture

I am conscious of the other side of the picture. There is apparently an unlimited demand for our products. There is neither steel nor pig iron enough at present to supply our needs. New homes that will create new demands for our products are being built all over the country. There are a hundred signs that prosperity is going to continue indefinitely, but I also know that "Man does not live by bread alone," and that mental attitudes many times are more important than statistics. Remember what happened when meat came into the butcher shop at fantastic prices. If the public should decide that it does not want houses at the present outrageous costs, or automobiles at the skyscraping prices, then there may be more steel for us than we can use, and if the public should decide to assume a cautious attitude in its buying there may be more stoves and heaters than our customers will want. These things won't happen but they are a possibility, and it is never a good idea to underrate the unfortunate things that may be crowding upon us even though there is little likelihood of their catching up with us.

The effect of Regulation "W"

At a time when prices are advancing, Federal Reserve Board Regulation "W" is a menace. A down payment of one-third with fifteen months to pay rules out of the market many people whose business the re-

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Appliance selling in 1947

presenting four basic requirements plus additional pertinent suggestions

By John M. Bess • EXECUTIVE VICE PRESIDENT, APPLIANCE DIVISION, NOMA ELECTRIC CORPORATION

AS to appliance selling in 1947 in general, and the selling of cooking equipment in particular, I believe they should be programmed along lines which will give wholehearted recognition to these four basic requirements:

Requirement No. 1: Appliance selling in 1947 should be *1947 in spirit and outlook.* It must be on the beam. This means greater-than-ever consideration for such problems as convenience in use, styling to please the eye and ease of purchase. It also means that we must now cheerfully accept the end of the soft seller's market and welcome the return of competitive conditions in which the buyer determines how many of us shall live and how many shall die.

Requirement No. 2: Appliance selling in 1947 should be *cooperative.* It is most important for all of us to realize that the big battles in selling during the next few years will be between industries more so than between individual companies within the industry. We had better organize to combat the selling efforts of the automobile manufacturers, the television set makers, and the host of others eyeing the consumer dollar with that "come to papa" look.

Requirement No. 3: Appliance selling in 1947 should be *dramatic.* It should "sing out." It should be thorough in its staging. This means intensive training courses for salesmen and service men in which visual methods play a prominent role. It also means proper instruction of buyers in the use of equipment and an ever-ready willingness on the part of executives to learn from honest complaints so that the assembly line will respond, as quickly as possible, to the findings in the field.

Requirement No. 4: Appliance selling in 1947 should be *profitable* selling. Let's continue to figure a profit into the price of what we make so that we may all continue to prosper. While it is inevitable that profit margins per unit will shrink, it would be shortsighted indeed if, through miscalculation or any other cause, we were to find ourselves in a price-cutting atmosphere which would smother all efforts towards a united front in the industry.

. . . I should like to make this further recommendation. Let's proceed with our promotional plans *as though we were a new industry*, and as though we were unfolding before the eyes of the world for the first time a new horizon of utility and enjoyment. Talk of romance? I am sure we have oodles of that stuff to dish out. Just let's "cook it up" in most eye-appealing and palatable form. The public is waiting to be served.

The "zero era" is outmoding kitchen equipment

The growing acceptance of frozen foods is fast outdating some of our concepts of kitchen management and is outmoding the equipment in the kitchen, including the range.

There isn't any doubt that the household refrigerator is being restyled for what might be called the "frozen food era" or, if you prefer, the "zero era." In 1947, the drive will begin in earnest to replace present household refrigerators with the new type, having a freezer compartment of one to one and a half cubic feet.

We need not go berserk in our estimates of how soon frozen foods will become a daily part of the family diet in order to recognize their influence upon the ranges of tomorrow. For one thing, the big educational problem in connection with frozen foods is their preparation for the table, involving a new set of instructions in so far as cooking equipment is concerned.

The growing popularity of frozen pre-cooked foods is largely due, no doubt, to the distaste which housewives have for being chained to their kitchens for so many hours of the day. Very few kitchens were designed with a view to making the time spent in them convenient and pleasurable.

In many homes, particularly in rural districts, frozen pre-cooked foods will be wanted because they provide an opportunity, in effect, of "eating out"; and they bring into the home, for the first time, the culinary achievements of world-famous chefs.

Whatever the reason, the net result for the housewife will be a reduction in the number of hours now spent in standing over a hot stove and less use of the stove for purposes that are associated with the thought of kitchen slavery.

We can well emulate the example of the household refrigerator manufacturers who are adapting their 1947 models to the space and temperature needs of frozen foods. We would profit also by following their lead in other ways, particularly in encouraging replacements by establishing many reasons for making them. Must we wait for a stove to *fall part* before the idea of getting a new stove occurs to the owner?

Right now, the household refrigerator industry is aiming at the replacement of refrigerators which are only a few years old. There are surely a much greater number of stoves which are much older and in greater need of replacement.

The selling challenge

. . . for want of proper instruction in a balanced diet, many persons of ample means are known to be starving. And, in a sense more pertinent to our discussions here, if this and the other industries of our great

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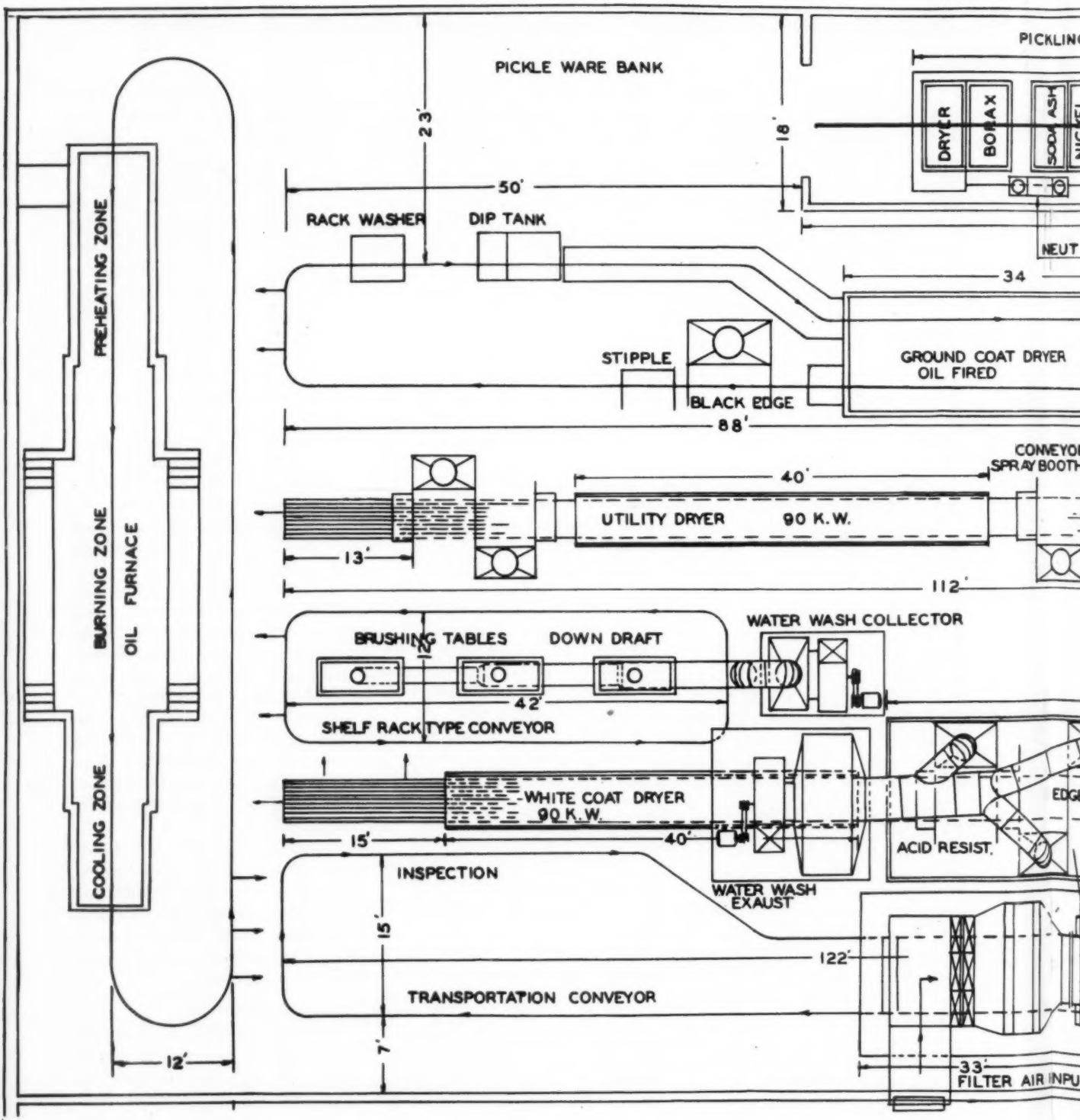
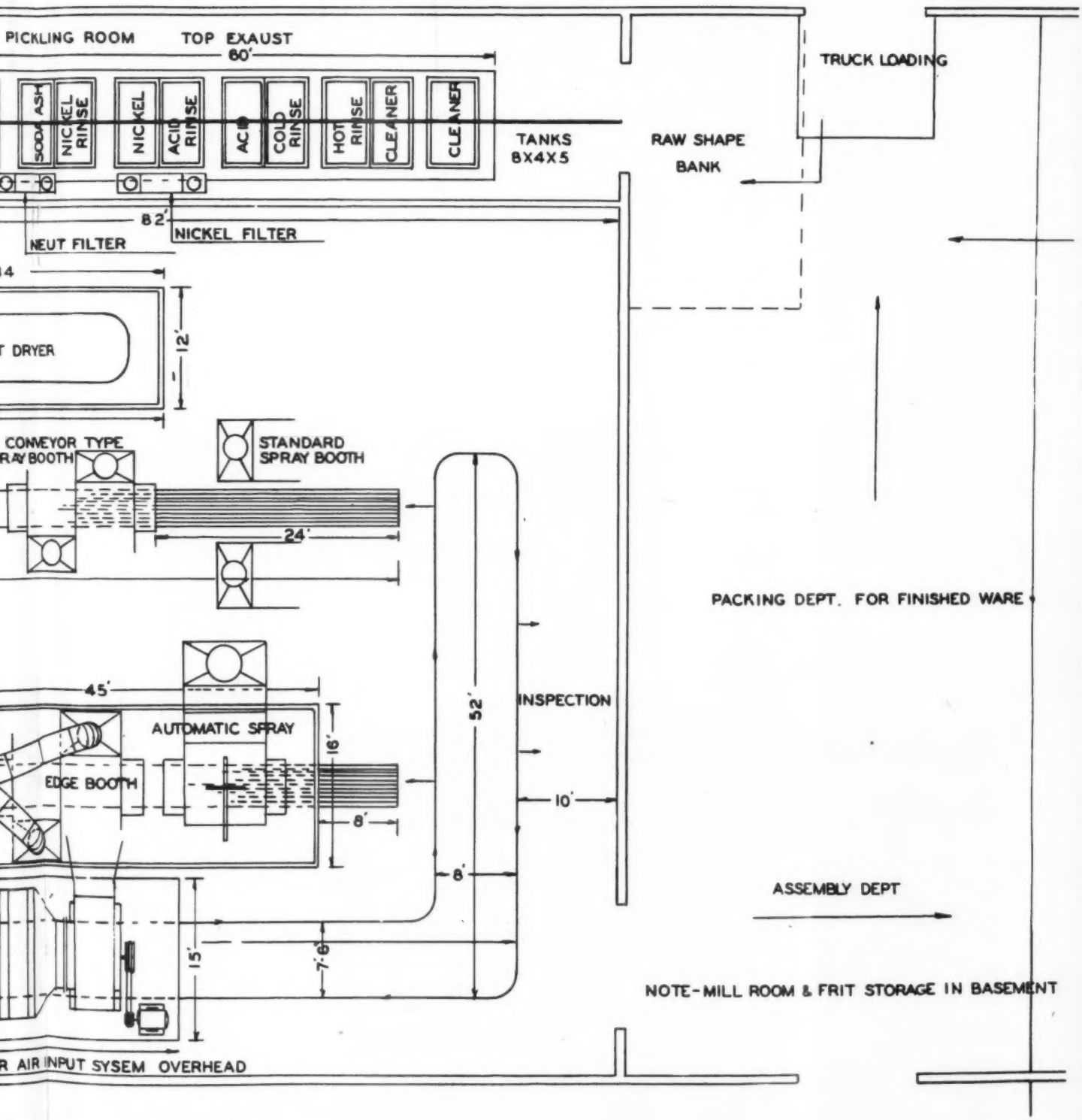
Plant Layout No. 7 . . . . .

A single continuous furnace enameling



(Plant descriptionsta

eling plant for stove parts and jobbing



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QUICK TRIPS TO ENAMELING PLANTS

A visit to American Valve and Enameling Corp.

By DANA CHASE

A VISIT to American Valve and Enameling Corporation, Indianapolis, Indiana, is always worth while for any one interested in porcelain enameling, for C. A. Wulf, company president, always has something of interest "up his sleeve."

Developed screen process

As most enamelers know, "Charlie" is the man who took over the original foreign patents and developed some of his own on screen process decoration for porcelain enamel, after others had failed to get satisfactory results with it in this country, and developed equipment and methods which have made it a most practical asset to the industry.

American Valve has a new type continuous furnace which incorporates some of Charlie's and his son's ideas. A feature in which he is particularly interested is an air circulating system for producing a six-foot air curtain at both ends of the furnace. This differs from the conventional practice of providing an air seal at the extreme end of the furnace.

A slot in the roof located 8 feet from the end of the furnace picks up the heat as it tries to escape to the door. It is then returned through a slot in the roof about 2 feet from the end of the furnace, and this slot is on an angle designed to direct the returning air back into the furnace and away from the door. It is designed to give a 6-foot air seal. The furnace is only 56 feet long.

In the return pipe on top of the furnace there is a valve which can be opened to mix fresh air along with the warm air returning to the furnace. Mr. Wulf also expects to control humidity in the new furnace.

The right hand man in the business is his son, Gus Wulf, who has grown up with the company and knows every operation from A to Z. Another son, Charles, Jr., returned from World War II service after serving in the U. S. Naval Reserve.

Among the products which American Valve produces is a cover for cement blocks. There have been many covers made for concrete blocks to weather proof them, but porcelain enameled steel successfully applied would offer definite advantages.

At this time Mr. Wulf is building a ranch type house for his son that will be covered with these porcelain enameled pans that are snapped onto standard cement blocks just as they are being laid in the building. Says Charlie, "If you want the inside of the building covered with porcelain

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Above: This photograph shows the circulating system mounted on top of the continuous furnace. The system provides the 6-foot air curtain described.

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The new straight-through, continuous porcelain enameling furnace recently completed in the American Valve and Enameling Co. plant. Standing at the pyrometer controls is Gus Wolf, plant superintendent.

The Washington round-up

By Wilfrid Redmond

(December 10, 1946)

STEEL production has again been hit by the walkout of John L. Lewis and his coal miners. CPA has ordered a halt on the flow of bituminous coke to steel mills in order to insure supplies for manufactured gas utilities. This order was still in effect after Lewis had called off the coal miner strike, because the gas utilities were in a precarious position. Steel mills, however, have sufficient inventories of coke to keep going for a while, and the normal supply lines will be re-opened by the time they are running low on coke.

Load of "rated orders" reduced on steel and pig iron

It will take steel several weeks to recover from the walkout. To ease the load, CPA has issued orders modifying acceptance by the mills of rated orders for steel and pig iron. After Jan. 1, steel mills will be permitted to reduce their rated orders to 25 per cent of scheduled production. This action was taken because 20 per cent of rated orders in December were not placed until late and many mills which had to take them had up to 50 per cent of production in rated orders. CPA has also issued a direction which will enable foundries to reduce the load of rated orders for pig iron. It provides that CPA may issue directives in the case of foundries with overloaded schedules permitting them to reject rated orders. The action was taken so that foundries might have capacity available for urgently needed production.

The Usable Surplus Steel Industry Advisory Committee of the War Assets Administration has recommended that procedures be shortened to permit channeling of surplus steel to small manufacturers.

Lead — antimony

CPA is under pressure by industry to remove end use controls on lead. Civilian Production Administrator John D. Small said recently it is too soon to start making toy soldiers of lead and that he did not believe controls should be lifted at this time. However, it is understood that CPA is reviewing the situation and may revoke Lead Order M-38.

Import controls on lead have been removed. Foreign producers, however, are booked through the first quarter of 1947, so this move did not contribute anything to the lead supply.

In a recent action, CPA removed the 25 per cent set aside on lead which has been reserved for hardship cases. This will make available about 6,000 tons of lead monthly, formerly allocated on application only.

Import controls on antimony were also recently removed by CPA. The Government thereby suspends its foreign purchase program, except for contracts already in effect or under negotiation. Private industry may purchase antimony from foreign producers, except from certain areas such as China and Bolivia where the Government will continue to purchase.

The soda ash situation

Indications are that the present production of soda ash will be 15 per cent below requirements of essential users with no immediate prospect of an increase in 1947 to overtake the demand. Under the voluntary distribution plan, recently instituted by CPA, industry will make every effort to distribute the supply equitably and will increase its present rate of deliveries of soda ash to aluminum producers by 45,000 tons a year.

CPA has issued direction 21 to PR-28, limiting priority assistance to emergency cases or for use in stepping up production facilities designated by CPA as critical. It is estimated by CPA that 156,000 tons of soda ash per year will be required by the aluminum industry to operate at 85 per cent of its present capacity.

Allowance will be made in 1947 for 400,000,000 pounds of aluminum for prefabricated houses for the Veterans Emergency Housing Program.

However, this program for soda ash in 1947 may be thrown out of balance March 31, when the Second War Powers Act expires. If it is not extended, Soda Ash Producers will be under no compulsion to supply aluminum producers. For this reason, it would appear that the aluminum house program does not have too bright a future.

The Second War Powers Act extends to June 30, 1947, only so far as building materials allocations and priorities are concerned. Soda ash, although it is a component of building materials, cannot itself be classified as such, and so will be in a free market after March 31.

NHA—bathtub setasides— appliance credit restrictions

Frank Creedon, able administrator on many Government programs, succeeds Wilson Wyatt as National Housing Administrator. Wyatt resigned when the White House announced the Veterans Housing Program would have to be modified. Creedon stands for relaxation of restrictions on industrial and nonveteran residential construction.

The Wyatt set asides of bathtubs and other products will be modified, or the distribution handled in another way. The prefabricated house programs will continue but Wyatt's concrete bathtubs will probably be abandoned.

Refrigerators, stoves, and ranges remain under deferred credit restrictions of Regulation W, which was relaxed December 1 on 12 other items by the Federal Reserve Board.

Washington production figures

Latest production figures available —for October—show an increase of 20 per cent in shipments of mechanical refrigerators to 280,000 units from 233,000 units in September. This is still 9 per cent below the 1940-41 monthly average level of 309,000.

October shipments of washing machines were up 25 per cent to an estimated 265,000 units from 212,000 shipped the previous month. The October shipments were 68 per cent

above the 1940-41 monthly rate. Included in the October figure is an estimated production of 18,000 midget type washing machines.

Electric range production increased 23 per cent to 75,000 units, a new high, and 59 per cent above the 1940-41 monthly rate of 47,000 units.

October shipments of gas ranges rose 23 per cent over the previous month to reach 188,000 units. The 1940-41 pre-war rate was 163,000 units a month.

Some materials will continue critical through 1947. No balance in supply-demand position is in sight for next year for bathtubs, lavatories, and water closet bowls. The increase in demands is due to modernization and replacement activity.

An analysis of reported shortages shows that maldistribution of goods is an important factor. Producers are allocating supplies to dealers on an historical basis. An analysis of permits for non-farm residences in the first nine months of 1946 shows that this allocation policy is out of line with current needs.

The Bureau of Labor Statistics report shows that sizable declines have occurred in dwellings started in some Eastern areas relative to starts in the U. S. in 1946 compared with 1941 (first nine months in each case). Important gains, on the other hand, have been made West of the Mississippi River. These shifts, which may be further analyzed by manufacturers on a state-to-state basis, carry interesting implications for manufacturers of household goods. Adjustments by producers and suppliers to the new demand pattern will eliminate many reported shortages and speed up the residential construction program, CPA said.

CPA warns of the danger in rapidly rising overall inventories in durable goods which have increased about $550 million. Although overall inventories are still not adequate in light of the high rate of sales and shipments, and in view of price increases which are reflected in the dollar value of stocks, CPA warns that excessive depreciation of inventories played an important part in the high rate of business failures in the deflation that followed World War I.

Inventories are still low relative to the volume of business being transacted.

Shipments of porcelain enameled products reached $8.1 million in October, an increase of 22 per cent over September shipments. Increases were shown for each major type of porcelain enameled product. Cooking, household, and hospital utensils accounted for 34 per cent of total October shipments.

Comparative product shipments — October and September

	October	*September*
Signs	$ 437,198	$ 371,637
Stove Parts	813,633	637,920
Refrigerator Parts	557,535	470,592
Reflectors	494,925	422,787
Cooking, household, hospital utensils	2,754,339	2,360,563
Table Tops	575,297	476,506
Store fronts	197,869	133,341
Washing Machine Parts	794,573	619,422
All other	1,517,187	1,199,461

(December 13)

The President established the Office of Temporary Controls on December 12. It will consolidate the functions of CPA, OPA, OWMR, and OES. Major General Philip B. Fleming, administrator of the Federal Works Administration, was named to head the new agency. Controls will be removed as rapidly as supply situations permit, but the President would not forecast how long the agency will operate.

Don't pay any attention to Looie, he worked for the Department of Internal Revenue for years!

Meeting with the enamelers clubs

THREE of the active Enamelers Clubs held meetings during the month of November. The Central District Club held its meeting at the Lake Shore Country Club, East Cleveland, Ohio, on November 15. The Eastern Enamelers Club held its meeting at the Ritz-Carlton Hotel, Philadelphia, on Saturday, November 23. The Chicago District Enamelers meeting convened at the Graemere Hotel, Saturday, November 30.

Philadelphia

HOWARD WILLIAMS, secretary of the Eastern Club, reports the November 23rd meeting as one of the most informative and interesting thus far held by the club. Approximately 80 members and guests were present. Discussion during the business meeting included increased membership, cooperation among Enamelers Clubs and the publishing of news letters when important information is available.

The program committee announced a plan to hold a "get-together" meeting and "outing" during the early part of June. The outing will be held at Reading, Pa., with Len Bilger, Prizer-Painter Stove Works, as chairman of the committee.

W. H. (Woody) Wilson, Ferro Enamel Corporation, was appointed chairman of a membership committee.

Club president, Nathan Klein, Caloric Stove Corporation, introduced the three program speakers.

The first speaker on the program was Herman Cook, of O. Hommel Company, who discussed "The Importance of Constant Supervision in an Enamel Plant." In his talk, Mr. Cook gave examples of specific cases in producing plants where production and quality of results were both above and below par to demonstrate the importance of employee training and adequate plant supervision.

The second speaker, R. R. Danielson, Metal & Thermit Corp., gave the Club a report on the meeting of the Coordinating Committee of the Enamelers Clubs, and urged the Eastern Club to lend its wholehearted support to the program.

The third speaker, Dr. G. H. Spencer-Strong, of the Pemco Corporation, outlined the proceedings of the 8th Annual Porcelain Enamel Institute Forum.

Cleveland

FRANKLIN (DEKE) BOND, secretary-treasurer of the Central District Enamelers Club, reports that the first fall meeting of the Central District Enamelers Club was held at the Lake Shore Country Club, East Cleveland, November 15, with 74 in attendance.

President Meeker welcomed the members and guests, and introduced Prof. A. I. Andrews, University of Illinois; Mr. Albert Shaner, representing the Owens Illinois Glass Company; and the Club officers.

Norman Stolte, Enamel Products Co., reported on the Coordinating Committee meeting held at Urbana. All of the proposals outlined at the Urbana meeting were reported and commented on by Stolte. The Club unanimously approved the motion to accept the Committee's proposals and follow up on the suggested program.

The president announced the little matter of annual dues to be collected at the next regular meeting in December or January.

The first speaker for the evening was William C. Clarke, general manager of Metalwash Machinery Company, Irvington, N.J., whose subject was "Continuous Spray Equipment as Applied to Cleaning and Pickling for Porcelain Enameling." *(See similar discussion by Mr. Clarke on page 21 of November, 1946,* finish.)

The second speaker was Dale Cannon, director of supervisory development, White Sewing Machine Company, whose subject was "The Human Angle of Production." Mr. Cannon offered a timely and interesting discussion of supervisory problems, with suggested methods for their possible solution.

The final program feature was a sound-color production "Blowpipes," by Mr. Shaner of Owens Illinois.

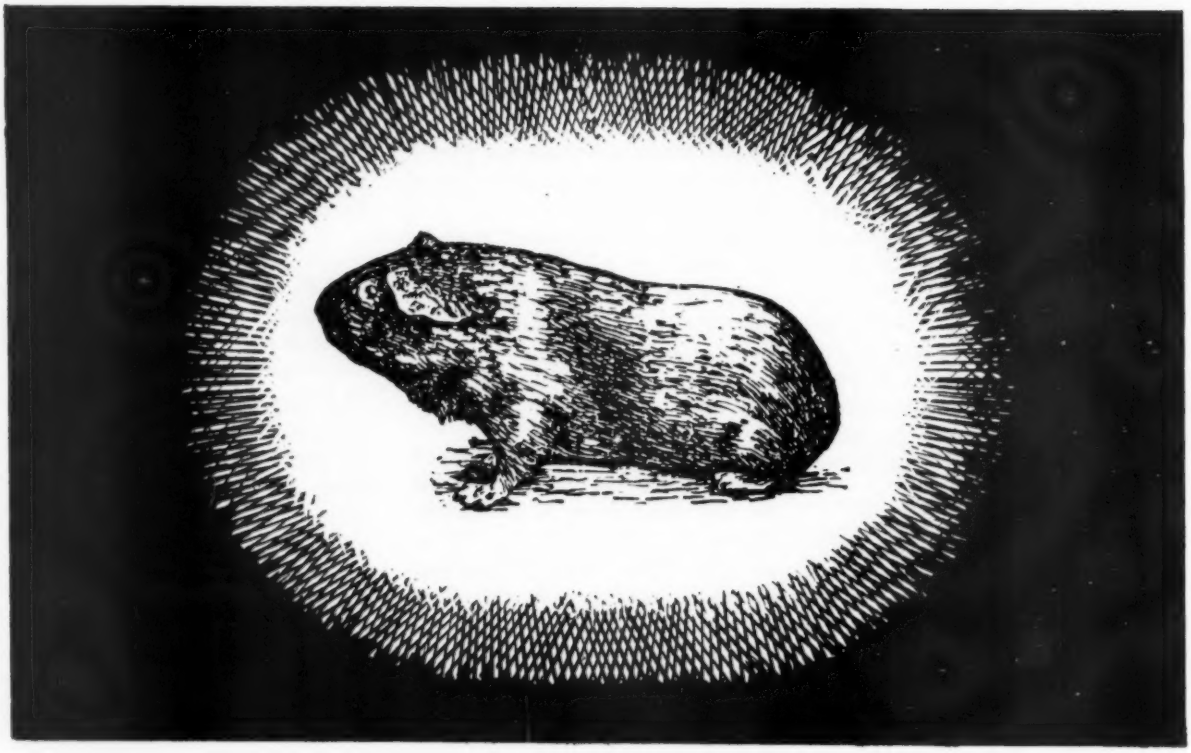
Chicago

THE Chicago Club held an interesting meeting before a packed house at the Graemere Hotel, Saturday, November 30. Principal matter of business was a report by G. W. (Jerry) Hofstetter, representative to the Coordinating Committee meeting, which was followed by a motion carrying unanimous approval of the Club to the Committee's suggestions as outlined.

Professor A. I. Andrews, head of the Department of Ceramic Engineering, University of Illinois, and associate editor of *finish*, gave an illustrated lecture in answer to the question "In What Ways Can the Enameling Industry Profitably Undertake Research?"

Professor Andrews quoted definitions of research and engineering by Vannevar Bush as follows: "Research is diligent systematic search for new facts or relationships. Engineering, in its modern sense, is the application of science in an economic manner for the benefit of man."

The charts, which were used as a background for his lecture, outlined the kinds of research, including fundamental, applied and plant research. He suggested the following as reasons for constant improvement: obsolescence, advances of competitors, improved quality, improved costs, new products, improved processes and new materials. Other charts covered such subjects as: "Where and by whom," "Essentials to successful research," "Selecting a problem," "Method of attack," and "Record systems." He then outlined the the essentials of a successful research staff, their individual qualifications, chronological process in research, the status of a research group, and ended by outlining a number of important enamel research projects, both fundamental research and applied research.



ING-RICH "FRIT" CUSTOMERS ARE NOT GUINEA PIGS!

★ Of one thing you can always be sure . . . ING-RICH doesn't throw a new frit formula on the market for the customers to try out. We don't ask you to be our guinea pigs.

The production of PORCELFRIT is a vital part of our business. In making a line of quality table tops, and as one of the largest job enameling plants in the country, we have ample chance to try out for ourselves every new development in frit *before* it comes to you. Result—*you can count on* PORCELFRIT *to be right.*

In addition, ING-RICH ceramic engineers with long practical training are available to make sure PORCELFRIT is right for *you*. They will come to your plant at your request—as trouble shooters, without obligation to you—to prove our case.

It's our long experience that makes PORCELFRIT the choice of Ceramic Engineers "in the know."

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PORCELFRIT

NEWS

Trenton (N.J.) ACS section annual meeting in January

At the third meeting of the fall season of the Trenton Section (A.C.S.) held Friday night, November 22, plans were made for the annual organization meeting to be held January 24, 1947. At this time officers will be elected and installed for the new year. Topic for the evening will be "material handling."

Scott J. Courtney celebrates 50th year with Drakenfeld

Scott J. Courtney, president of B. F. Drakenfeld & Co., Inc., recently marked his golden anniversary with the company. He joined the organization in September, 1896, twenty-seven years after the company was founded by John Marsching and Edward E. Drakenfeld. In December, 1925, Mr. Courtney became secretary-treasurer and held that position until November, 1931, when he was elected president.

At a testimonial dinner in his honor, Mr. Courtney traced the growth of the company from its inception in 1869. He recalled that in the early days the company was principally engaged in the marketing of imports of various kinds, and that the vitrifiable color field soon developed into one of the major interests of the business.

The rapid development of the nation's ceramic plants lead the company into the manufacture of colors and special chemicals in 1920. Since then, the organization has constantly expanded its manufacturing operations and steadily increased its facilities for serving the porcelain enameling industry and other ceramic fields.

The company is looking forward to even more rapid growth in the years ahead, said Mr. Courtney, because the industries served have such a great backlog of demand and new uses for colors and chemicals are turning up daily.

Wheeler Reflector executive retires

After eighteen years of successful plant management with the Wheeler Reflector Company, John Foster has retired and will devote all his time to the studies of Ornithology and Malacology, his hobbies for a number of years. He is listed in the Scientific "Who's Who" as a result of his work in these fields.

Foster first went with the Wheeler Reflector Company in 1920 as a time study and methods engineer. The year 1925 took him to the General Electric Company, in Lynn, Mass., where he gained valuable experience in fabrication and porcelain enameling. In 1927 he returned to the Wheeler Reflector Company as enamel superintendent, and the following year was made plant manager. He is credited with increasing production tenfold and keeping the ship on an even keel through the depression and the recent war years. He is well-known throughout the porcelain enamel industry as an authority on the application of vitreous enamel.

He served as an Army Lieutenant in World War I, and on the War Manpower Commission through World War II.

A new warehouse equipped with the latest facilities for stocking tool steels, and designed to serve southwest Ohio and the State of Kentucky, was officially opened December 6 in Dayton, Ohio, by the Allegheny Ludlum Steel Corporation, it was announced by Russell M. Allen, vice president in charge of sales. Operation will be under the supervision of R. J. Swan, district sales manager.

American Potash & Chemical to expand soda ash and borax production

Good news for industries suffering from the continuing shortage of soda ash and borax broke in Los Angeles last month with the announcement that the American Potash & Chemical Corporation will expand its Trona (Cal.) plant to increase substantially its output of these two scarce essential chemicals.

Construction of a $4,500,000 carbonation plant will start in 1947 at the A.P. & C.C. works at Trona, it was disclosed by B. R. Armour, chairman of the board of directors. The new plant will have an estimated annual production of 60,000 tons of soda ash and 30,000 tons of equivalent refined borax. In 1945, the company produced 82,000 tons of soda ash and more than 98,000 tons of borax in addition to other products.

AP&C reports the glass industry to be the heaviest user of borax. Manufacturers of enamels and glazes are

the next largest customers. Substantial quantities of boron products also are used by other industries such as leather, textiles, glue, toiletries, abrasives, detergents, starch, paper, antifreeze compounds and fertilizers.

In addition to the new soda ash and borax plant, the company will build a new research and chemical engineering facility to cost approximately $300,000.

Record breaking factory sales of household washers

All records of the home laundering equipment industry were broken in October with factory sales of household washers totalling 247,350, an increase of 34 per cent over sales of 184,215 in September and 68 per cent higher than 147,390 sold in October, 1941, final full pre-war production year.

The industry has had only two other above-200,000 washer months in its history — 213,611 in April, 1941, and 213,862 in July of the same year — according to announcement by the American Washer and Ironer Manufacturers' Association.

Washer sales for the first ten months of this year totalled 1,611,357, compared to 1,743,545 in the same period of 1941.

New Rohm & Haas plant

The Rohm & Haas Company, of Philadelphia, Pa., announces the acquisition of about 500 acres of land on the Houston Ship Channel, Deer Park, Texas, for use as a plant site. The company is planning to manufacture chemical products at its new location. Construction of the plant is expected to get underway early in 1947. Rohm & Haas now operates plants at Bristol and Philadelphia, Pa., and at Knoxville, Tenn.

Laundry equipment manufacturers produce instruction manual for schools

The American Washer and Ironer Manufacturers' Association has placed in circulation a manual for school instruction in the proper use of the household washer, dryer and ironer, on which editorial work is said to have been conducted for two years. "Simple Ways to Better Cleanliness" was prepared on the recommendations of household economics instructors, and a sufficient quantity for classroom use is given free to any teacher requesting them of the Association and supplying necessary information concerning the nature of her school and whether it is outfitted with the various home laundering appliances.

Florence introduces "Registered" range

Described as the "first really new design in gas ranges since the war," the Florence Stove Company has announced that its new Registered gas range will be on display at the January Markets.

The new range features models with the new waist-high "Broilercue" as well as low broiler ranges. It is pointed out that Broilercue models are actually 2-oven ranges. Larger cuts of meat can be roasted, broiled, or barbecued in the Broilercue while hot breads, casseroles, or cakes are baking in the oven. A porcelain enameled pan and aluminum grille, which is adjustable to three positions, is mounted on the Broilercue door. Both Broilercue and low-broiler models have extra large baking ovens and the deluxe ranges are equipped with "panoramic sight window" and interior oven light. Flush-to-wall installations are simplified by locating the gas intake pipe within easy reach through the top burner openings.

Bendix begins national retail sales retraining program

Retraining of retail salesmen on a national scale has been started by Bendix Home Appliances, Inc., under the direction of N. D. Craighead, assistant sales manager, and A. C. Olander, retail merchandising manager.

With the refresher course for 161 trainers completed December 20, field classes for 25,000 persons who sell the Bendix automatic washer will be concluded by Feebruary 1, Mr. Olander said.

The Shoberg Tool Company, Chicago manufacturers of tools, dies, jigs, fixtures or special machines, is now a division of Barnes & Reinecke, Inc.

R. L. Van Cleve has been appointed director of purchases for Carnegie-Illinois Steel Corporation, it

has been announced by C. R. Cox, president of this United States Steel subsidiary.

New P.A. at Armco—Ashland

Announcement has been made of the appointment of Clarence G. Roll to the position of purchasing agent of the Ashland, Kentucky, division of The American Rolling Mill Company.

In this new assignment, he replaces C. J. Moegling, who recently passed away after 23 years as the division's purchasing agent.

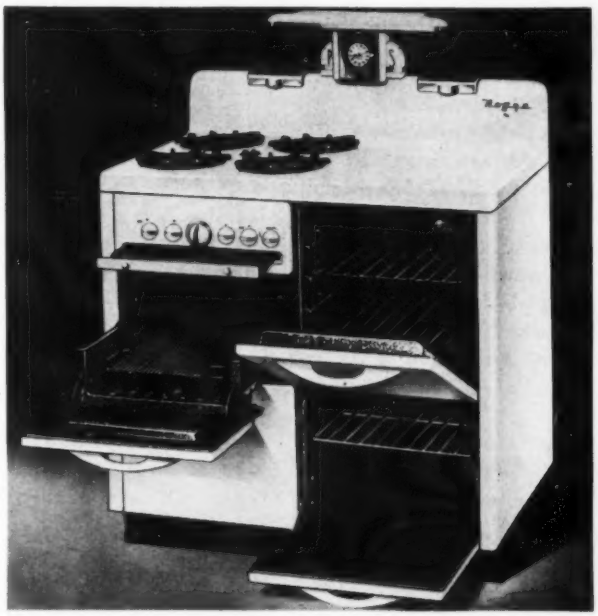
Mark W. Pender, director of market research for Magic Chef gas ranges, has been appointed member of a Task Force Committee, purpose of which is to provide cooking facilities for veterans' housing, according to a recent announcement of Institute of Cooking and Heating Appliance Manufacturers. Pender is also a member of the Housing Committee of the Institute.

Deepfreeze appoints home economics director

F. F. Duggan, general sales manager, Deepfreeze Division, Motor Products Corporation, North Chicago, Illinois, announces the appointment of Miss Geraldine Corman as director of the Deepfreeze home economics department.

The board of directors of Philco Corporation declared a year-end dividend of twenty cents (20¢) per share of common stock payable December 23, 1946, to stockholders of record December 13, 1946. This year-end dividend brings total payments for 1946 on the Corporation's common stock to $1.00 per share, which was the amount paid in 1945.

Lots of porcelain enamel



There's lots of porcelain enamel displayed in and on this Norge gas range, Model N-420. A feature of this new range is the high broiler mounted to one side of the stove which permits the user to broil without excessive stooping, and also permits baking at one temperature and broiling at another at the same time. Other features are: slide-out broiler; oven which measures 16″ x 14½″ x 20″ and is capable of handling large turkey; oven heat control, with balanced oven heat; one-piece top; spiro-speed burner; thick insulation; and utensil drawer.

Design service for shipping containers

A service through which manufacturers will be able to plan packages for new products is being offered by the Wirebound Box Manufacturers Association despite the current shortage of veneer which is hampering box production.

The new plan will enable manufacturers to gear their designing and engineering of containers for future products to the development of the products themselves. When a new product is ready for marketing, the container designing will have been accomplished. This, in turn, permits advance scheduling of container production, a safeguard during periods of critical container shortages.

New engineering and consulting service

After a nine year association with American Wheelabrator & Equipment Corp. (formerly American Foundry Equipment Co.) in industrial and development engineering capacities, Otto E. Zahn has retired from the company to set up his own consulting service.

Montgomery Ward appointments

I. M. Remen, manager of Montgomery Ward & Company's Plumbing and Heating Division, has been appointed director of personnel for the Merchandise Division on the staff of V. R. Edstrom, vice president and general merchandise manager. →

W. E. Shattuck, Mr. Remen's assistant for the past two and a half years, has been appointed division manager of Plumbing and Heating, having been associated with Wards and this division for the past fifteen years.

2nd International Lighting Exposition activity begins

exhibit application deadline January 15, 1947

With the mailing of the Exhibitors' Data Bulletin and Exhibit Space Applications, organized activity in behalf of the 2nd International Lighting Exposition and Conference really gets under way according to an announcement by E. C. Huerkamp, chairman of the Exposition Operating Committee. The Exposition which is sponsored by the Industrial and Commercial Lighting Equipment Section of the National Electrical Manufacturers Association is to be held in Chicago on November 3-7, 1947.

"The great interest manifested in the 1st Exposition last April, when ten thousand electrical contractors, wholesalers, architects, utility men, and others crowded into the Exposition Exhibits," Chairman Huerkamp states, "has attracted the attention of all those who serve in the lighting industry. From the interest already shown, it is certain that there will be an even greater representation of exhibitors and products at the 2nd Show. These exhibitors will show all kinds of industrial and commercial lighting equipment, airport lighting, floodlighting, street lighting, wiring devices, paints, maintenance equipment, and other aids to illumination. (Editor's question: *Will porcelain enamel be represented?*)

"For these reasons and the fact that the deadline for space applications to qualify for the drawing is January 15, 1947, those who plan to exhibit are urged to mail their applications as early as possible. Manufacturers who failed to receive the Data Bulletin are urged to write Mr. A. B. Coffman, show manager for the Exposition, at 111 W. Jackson Blvd., Chicago 4, Illinois."

Dings Magnetic Separator moves to new plant

Announcement comes from Dings Magnetic Separator Company, of Milwaukee, Wisconsin, that after forty-seven years in engineering and manufacturing in the field of magnetic separation the company is centralizing its manufacturing facilities previously carried on in two plants into a new plant in Milwaukee's southwestern industrial district. New equipment and machine tools have been installed throughout. In line with latest color engineering practices, the shop and machine tools are painted with colors recommended to reduce eye strain and provide pleasant working surroundings. Dings officials say the new plant will make possible greatly increased production almost immediately.

It is stated that enlarged magnetic research and analysis laboratories now enable the company to analyze samples of industrial materials in carload lots when such analysis is important to the determination of proper types of magnetic separators to be used. Mr. R. L. Manegold, Dings president, says that laboratory service has, in the past, brought to light many industrial applications of magnetic separators.

Detrex appoints processing equipment manager

Detrex Corporation announces the appointment of W. E. Gilbert to the sales department as manager of the Processing Equipment Division. A. O. Thalacker, vice president and general manager of the company, in making his announcement, stated that Mr. Gilbert's new duties will deal directly with the numerous phases of automatic cleaning and finishing machines, dip tanks and rust proofing systems.

Armco elects three vice presidents

R. C. Todd, G. F. Ahlbrandt and Dr. Anson Hayes have been elected vice presidents of The American Rolling Mill Company by the company's board of directors, Charles R. Hook, president, has announced, indicating the promotions an appropriate recognition of long and helpful service to Armco.

Mr. Todd has been with the company for 46 years. He began work, after completing high school, as a water boy for the construction gang building the first mill building of Armco's Central Works. In 1904 he entered the company's sales division. In 1911 he was placed in charge of

to Page 44 →

OHCO White No. 850

Super Opaque FRIT

ATTENTION ENAMELERS!

HERE'S THE WHITE COVER COAT THAT YOU HAVE BEEN LOOKING FOR

Here at last is a frit that gives a really white porcelain enamel finish. OHCO Super-Opaque Frit 850 burns out to a beautiful true white color value. In developing this Frit, Hommel Engineers not only retained all of the best properties of a white enamel but actually improved many of the most desirable features found in a white frit.

A description of this beautiful white enamel finish would be inadequate beside the actual product. Give it comparative tests and decide for yourself its superiority. Check the 100% coverage and exceptional bond.

850 was developed to give a thinner one coat application. When necessary a re-operation coat can be applied and the same color value as one coat is retained.

OHCO Frit 850 assures better Porcelain Enameled parts with less warping and chipping, a lower firing temperature, higher reflectance, and better coverage.

You are under no obligation when Hommel Service Engineers iron out your problems. Write today and arrange for a demonstration of this new post war white cover coat.

Laboratory Controlled Production of Ceramic Supplies

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PITTSBURGH 30, PENNA.

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- FRIT for Steel, Cast Iron or Pottery
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- METAL POWDERS
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Our Technical Staff and Samples are available to you without obligation. Let us help you with your problems.

ARMY E NAVY

World's Most Complete Ceramic Supplier

sheet steel sales, and in 1917 he was made district manager at the company's Detroit office. He returned to Middletown as assistant general manager of sales in 1925, and in 1931 became assistant vice president.

Mr. Ahlbrandt, graduate of the University of Cincinnati, was first associated with Armco 42 years ago as a chemist in the Open Hearth Department. He became assistant superintendent of the department in 1907, and entered the Culvert Sheet Sales department in 1909. He became manager of sales in 1918, and in 1937 he was given the responsibilities of assistant vice president.

Dr. Anson Hayes has been with Armco for 18 years. He graduated from Drake University, Iowa, received his master's degree from Iowa State College and his doctor's degree from the University of Chicago. He then held the Chair of Chemistry at Iowa State College until he joined Armco. His first connection with the company was in 1928, as chief chemist of the research staff. He was made director of research in 1929.

Charles B. Grace, vice president and treasurer of the Heintz Manufacturing Company of Philadelphia, was elected as a member of the board of directors of the Pennsylvania Salt Manufacturing Company in a recent meeting of the Board.

Reception at ACS office

Members in attendance at the reception: left to right, R. B. Carothers, H. C. Spinks Clay Co.; W. Keith McAfee, Universal Sanitary Manufacturing Co.; Herbert F. Royal, Champion Spark Plug; C. L. Cruikshank, Great Lakes Foundry Sand Co.; H. B. DuBois, Consolidated Feldspar Corp.; C. S. Pearce, American Ceramic Society; Frank R. Henry, Simonds Worden White Co.

During the meeting of the Ohio Ceramic Industries Association in Columbus this fall, a reception was held at the office of The American Ceramic Society for the president, J. E. Hansen (director of service, Ferro Enamel Corporation), and the new technical secretary, R. L. Stone. The offices of the Society were rearranged to accommodate a crowd of about 180 who came for this occasion. The group which attended this reception was the largest number to be present at any similar reception.

It is reported that R. G. (Fuzzy) Rogers is now general manager of the Bradley Manufacturing Co., Kankakee, Ill., producers of stokers and farm implements. Rogers is well known to enamelers through his earlier connections at Servel and American Central, where he was factory superintendent and factory manager respectively.

Bendix sues Jacobs

An action has been commenced by Bendix Home Appliances, Inc., of South Bend, Indiana, manufacturer of the Bendix automatic home laundry, against F. L. Jacobs Co., of Detroit, Michigan, in the U.S. District Court for the Eastern District of Michigan, Southern Division, alleging willful and wanton infringement of the Wales et al. Reissue Patent No. 21,020, granted to Bendix Home Appliances, Inc., relating to automatic washing machines. Treble damages are asked. The washing machine which Bendix Home Appliances, Inc., alleges to infringe this patent is manufactured and sold by the F. L. Jacobs Co. under the trade name of "Launderall."

Pennsalt "purchase engineer"

Barton I. Hogarth, graduate mechanical engineer, has been named to the newly-created position of purchase engineer in the equipment and supplies division of the Pennsylvania Salt Manufacturing Co. purchasing department, N. W. James, general purchasing agent, announced. Mr. Hogarth went to Pennsalt from the Manhattan District Project.

Golden succeeds Morse at Florence

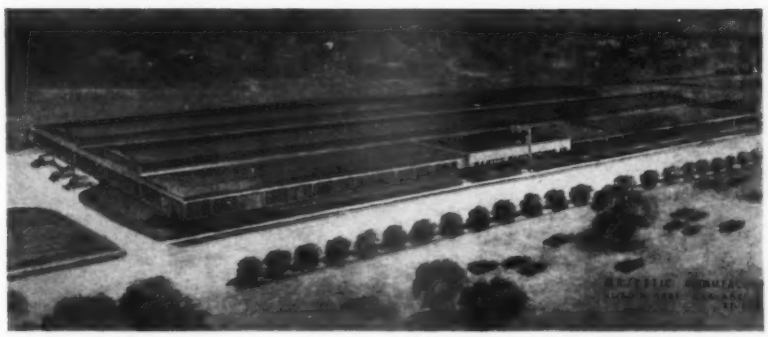
Harvey E. Golden was elected vice president of the Florence Stove Co., Gardner, Mass., it was announced at a meeting of the board of directors. Mr. Golden, former sales manager, succeeds Henry H. Morse, for many years prominent leader in the industry, who is retiring after 22 years with Florence.

Mr. Golden joined Florence in

1926. After serving as sales manager of sectional divisions, he became general sales manager at the home office in 1941.

Florence's president, R. L. Fowler, also announced that R. H. Taylor, former New York sales manager, has been appointed general sales manager to succeed Mr. Golden.

New plant for the Majestic Manufacturing Company



Contract for a plant to cost in excess of $500,000 has been let by Majestic Manufacturing Company, St. Louis, one of the oldest stove manufacturers in the country. The plant has been designed by Hugo K. Graf, architect, and is being erected at Neosho and Gustine Avenues, on a 23⅓ acre tract which allows for future expansion and ample parking space, railway sidings and driveways.

The building will have 126,000 square feet of area, and will be of the daylight type with two monitors of 60′ span running its entire length of 400′. In addition to the most modern facilities for storage, production and shipping, the building will include a general office, private offices, directors' room, display room, drafting room and laboratory. The factory entrance will lead to a personnel office, plant manager's office, committee room and first aid room.

Officers of the company are: John E. Russell, president and treasurer; P. R. Harrington, vice president and secretary; S. L. Culler, vice president; W. T. Baxter, vice president in charge of sales; C. Karr, assistant treasurer; and H. E. Funke, assistant secretary.

New owners of Pittsburgh enameling plant

New interests have taken over the management of Porcelain Metal Products Company of Pittsburgh (Carnegie, Pa.), and will continue to operate the plant as a porcelain enamel jobbing operation.

J. U. Meyer was elected president at the first meeting of the board of directors. A native of Dayton, Ohio, Mr. Meyer has had varied experience in the metal working industry for the past fifteen years, having served in various capacities at Dayton Pump & Mfg. Co., Ohio Fabricated Tank Co., Weimer Metal Crafts Corp., System Engineering Co., and Keystone Abrasive Wheel, Inc. For the past two years he has been president and general manager of the latter two companies, and will retain these positions in addition to his new appointment.

S. J. Gurney, treasurer and acting comptroller, was formerly with Westinghouse Electric Corp. and Blaw Knox Corp. He is now conducting research and plant expansion, which will allow the manufacture and merchandising of accessory items for the housing program early in 1947.

T. B. Mitchell, assistant to the president, was formerly director of purchases for the Pittsburgh Water Heater Corp. The incorporation of future production items will be under his control.

A. F. Petan, formerly enameling superintendent, has been promoted to plant manager. Mr. Petan has had fifteen years' experience in the enameling field. He was formerly with Enamel Products Co., Cleveland.

Clifford Frampton is the new enameling superintendent. He has served in a like position for twenty-three years with Beaver Enameling Co.

Emil J. Ranz is chief engineer, in charge of all engineering, architectural design and fabrication. Mr. Ranz was, for four years, with Enamel Products Co., and for the past eight years with Porcelain Metal Products.

Earl Walbridge, formerly vice president in charge of sales at Erie Enameling Co., will head the sales organization. Earl's experience covers twenty-five years in porcelain enamel sales and development work.

Standard enamel sign colors

The Electrical Insulation, Porcelain and Glass Products Committee, under the chairmanship of W. A. Simpson, Flashtric-Neon Company, Chicago, have drafted a chart of

Two Barrows Porcelain Enamel Company men, Sam G. Lang, secretary and treasurer, and Wm. A. Barrows, president, stand beside their Ercoupe.

standard colors for porcelain enamel on signs. The committee's recommendations will be submitted to the membership for official approval and adoption at the annual meeting next February.

As it stands, the chart specifies thirty basic colors as standard. These were selected after discussions with several oxide manufacturers, porcelain enameling companies and sign manufacturers. To avoid confusion and the necessity of selecting new names for the colors, it was agreed that it would be most practical to use the same color designations as those adopted by the Outdoor Advertising Association of America as standard paint colors for posters and bulletins. A few additional colors were added to meet the requirements for porcelain enameled signs.

Sign convention and exhibit scheduled for February

The National Electric Sign Association convention and exhibit will be held at the Congress Hotel, in Chicago, February 3, 4 and 5. The convention committee believes that from the number of inquiries and reservations that already have been received exhibit space will be booked to capacity and the meeting exceptionally well attended. They promise a program that will provide something of interest to everyone.

Among the program features will be a discussion of "Maintenance Problems and Methods" by four prominent sign buyers, who will speak on their maintenance and service requirements from the sign industry. There will be a report on the results of the NESA survey on maintenance methods and costs, and an open forum discussion.

"THEY'RE ALL FRIENDS OF HERS."

Consolidated Vultee in production on household appliances

Production lines at the Nashville Division of Consolidated Vultee Aircraft Corporation are booming again —not with military aircraft, but with consumer durable goods and parts for busses.

During 1947 the Nashville plant expects to turn out a vast quantity of gas and electric ranges, frozen food storage units and completed 44 passenger busses. Nearly 4500 employees are expected to earn close to $10,000,000 in the process.

From a low of 500 supervisory superintendents, engineers and maintenance workers following the war, the Nashville Division now employs 2,000 people. They are reported to be turning out a total of 370 ranges and frozen food storage units per day. A spokesman for the company says that when raw materials become more plentiful, range production alone will jump to approximately 1,000 a day and that ultimately 60% of the 850,000 square feet in the huge plant will be devoted to appliance manufacturing. The company further states that appliances such as ranges and frozen food storage units have required the installation of more than $2,000,000 in new conveyors and fabricating, painting and porcelain enameling equipment. It is stated that the porcelain enameling facilities can enamel stove parts equivalent in area to the exteriors of nine average-sized homes in eight hours.

To handle the heavy volume of steel and raw materials, the company has built a $250,000 railroad spur one and a half miles to the main line.

Robert J. McDonald has been made manager of the ironer division of Bendix home appliances, Inc.

New folding ironer

A folding ironer of entirely new design will be introduced to dealers and distributors of the Apex Electrical Manufacturing Company in January at the Home Furnishings Market in Chicago.

The new ironer can be "folded

to Page 48 (Column 3) →

Any woman's heart will yearn for one of the new, beautifully styled and enamelled "Universal" electric ranges made by Landers, Frary & Clark. Beneath the smooth, rich, glowing surface of that enamel is iron and steel which had to be clean as a whistle before coating and firing.

MANY REJECTS VS. "PERFECTION"

Under old methods of cleaning and pickling much of the work was rejected. Under a new method, developed with the help of a Pennsalt representative and Pennsalt products, the work was judged "perfect."

NO TANKS OR SOAKING . . . ALL SPRAY

In an enclosed unit, parts now move on an overhead conveyor; are never dipped. All cleaning, pickling and rinsing is done by sprays. Fumes are eliminated by a water wash. Pennsalt cleaners are used exclusively.

WHAT IS YOUR METAL CLEANING PROBLEM?

Pennsalt men have helped many manufacturers to turn out *better work—faster—at lower cost*—they may be able to help you. Write or wire to our Philadelphia headquarters and add our experience to your own.

PENN SALT

96 Years of Service to Industry

PENNSYLVANIA SALT MANUFACTURING COMPANY

Special Chemicals Division, 1000 Widener Building, Philadelphia 7, Pa.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • MINNEAPOLIS • WYANDOTTE • TACOMA

Once

THROUGH IS ENOUGH!

WITH THE

DINGS

DE-IRONER

Slip — whether recovered or new — needs only one pass through the Dings De-Ironer for thorough cleaning by removal of iron particles. This "one-pass" separator has no secret mechanism . . . It is more powerful and does a better job simply as a result of an accurately balanced magnetic circuit having longer coil windings for greater magnetic intensity; and many more lineal feet of stainless steel grid area to catch and hold iron present in the slip. *Dings De-Ironers, size for size, have 20% to 30% greater capacity than any other separators of similar type.*

Write today for full information on the right Dings De-Ironer for low cost, "one-pass" magnetic separation in your plant.

DINGS MAGNETIC SEPARATOR CO.
4750 W. McGeogh Avenue
Milwaukee 14, Wisconsin

De-Ironer Features:

- 20% to 30% greater capacity, size for size, than any other magnetic separator of this type.
- Stainless steel grids—spot welded and heavily chrome plated.
- Open or pressure models available—can be operated top-to-bottom or bottom-to-top.
- Solenoid safety valve, with only one moving part, prevents slip contamination in case of current failure.
- Float valve insures complete coverage of grids while De-Ironer is working.

Coils wound for continuous "High Intensity" operation.

Dings
"HIGH INTENSITY"

"Separation Headquarters Since 1899"

away" into its cabinet with the roller, shoe and other operating parts in a vertical position while not in use. The cabinet is designed to form an integral part of the modern kitchen-laundry.

The cabinet is 18" wide, 25" deep and 36" high. The *porcelain enameled* cabinet top is designed to provide a convenient work space.

Mascot Stove building new plant

According to a recent announcement, Mascot Stove Co., Chattanooga, Tenn., has started construction on a new plant involving an expenditure of a quarter of a million dollars for buildings and equipment. It is estimated when the plant is completed production capacity will be increased by 2½ times.

"CP" water heater requirements

Recommendations for proposed "CP" gas water heater requirements were set up at a recent meeting of the Water Heating Committee of the American Gas Association under the chairmanship of W. J. Schmidt, Long Island Lighting Co., Mineola, N.Y. The problem is being approached on a functional or performance basis with details of construction left to the manufacturers.

Following are the proposed requirements:

1. A "CP" water heater must, at all times, meet the current A.G.A. minimum requirements prescribed for construction and performance.

2. Such a heater must supply a minimum of 60 gallons of 160 degree water at the heater in the first hour of draw.

3. Item No. 2 shall be attained with an overall service efficiency of not less than 70% at the heater.

4. The heater must prevent excessive temperature drops due to turbulence, and must be capable of delivering 70% of its full tank capacity with a maximum drop of 5 degrees in water temperature. (In other words, minimum temperature should not fall below 155° F.)

5. The heater must be equipped with a carefully calibrated thermostatic control accurate within limits of 7% plus or minus. Such thermostatic control must be located to provide ready, accurate and convenient adjustment by the user.

6. The heater must deliver clean, full hot water service at the highest temperatures required for the modern home during the period of the manufacturers' warranty.

7. In the event of tank failure on any heater during the period of the manufacturer's warranty, the manufacturer shall replace the entire heater on a "no charge basis" F.O.B. destination which shall be

MOYNO—the answer to Your Pumping Problems

Here's the pump that combines the advantages of all other types in *exclusive* Moyno performance—stands up where other pumps *fail.* It has no pistons, yet discharges in pressures as high as 1000 psi.—no high internal velocities, yet delivers without pulsation. Moynos are the *answer* to your pumping problems. Types and sizes for every service.

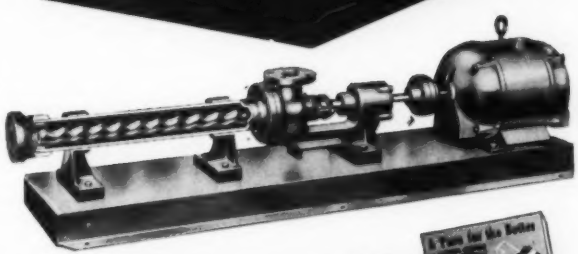
MOYNO vs. Piston Pump
Moynos have no valves; no pulsation; less weight; less bulk; better performance on *highly viscous* fluids; much longer life on abrasives; usually, lower cost.

MOYNO vs. Rotary
Moynos are not limited to moderate pressures and to services only mildly abrasive; do not depend upon critical end-sealing and large areas of diametrical clearance. Moyno sealing is all in *one replaceable element* with a minimum of constantly changing diametric seal, and no end-seal whatever.

MOYNO vs. Centrifugal
Moynos are self-priming; liquid velocities are low, smooth, uniform; displacement is positive. Moynos give better capacity-pressure regulation; can create higher *reserve* pressures; pump highly viscous fluids better, and with less wear.

MOYNO vs. Turbine
Moynos pump virtually anything; have no high-speed impellers or critical clearances; handle abrasives; *self-prime* at all lifts.

The Pump Without "Type" Limitations



NO PISTONS • NO VALVES
NO HIGH-SPEED IMPELLERS

Send for this Free Book

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In Canada: Robbins & Myers Co. of Canada, Ltd., Brantford, Ont.
MOTORS • HOISTS • CRANES • MACHINE DRIVES • FANS • MOYNO PUMPS • FOUNDED 1878

STILL GOING STRONG...

JUST nine months ago LAWNDALE, Chicago's newest jobbing plant, opened its doors for business. We started off with a "bang" and we are still going strong — twenty-four hours a day, and seven days a week.

And there are good reasons. LAWNDALE is holding its old customers and getting new ones because the work that is going out is all quality work and the time between order and delivery is at a minimum.

The experience of the owner-operators of this plant is paying dividends to customers. The 43 years of combined experience in practical enamel shop operation shows up in service and in the quality of the finished products.

If you have a porcelain enameling problem and haven't tried LAWNDALE service it will pay you to call us in for a discussion of your finishing requirements.

Drop us a line, or telephone —

LAWNDALE ENAMELING COMPANY • CHICAGO

1137-1139 West 14th Street (Postal Zone 8) • Telephone Chesepeake 5495

interpreted to mean the regular delivery point where the Utility or dealer accepts his factory shipments.

These requirements are now under consideration by the Water Heating Division of the Gas Appliance Manufacturers Association.

INDUSTRIAL LITERATURE

New edition of spring handbook now available

Accurate Spring Mfg. Co. announces the publication of the third edition of their *Handbook of Technical Data on Springs*. This 36-page handbook offers clear, concise data on such subjects as design formulation, load deflection, and the proper methods of specifying springs. Several helpful short cuts for making spring calculations are also presented. All engineers and designers who use springs should find the handbook very valuable.

Copies of the handbook may be obtained free of charge by writing Accurate Spring Mfg. Co., 3837 W. Lake St., Chicago 24, Ill.

"Combustioneering" data sheets

First ten of a series of "Combustioneering" data sheets especially prepared for combustion and process engineers are offered by the Industrial Division of Bryant Heater Co. Mathematical tables, properties of gases, metals and other materials, and gas orifice capacity tables are included in the initial sheets, which are intended to bring together useful gas combustion and industrial heating data not readily available in a single reference source.

Additional material will be added from time to time, in notebook punched sheets uniform with those now ready. Available on request to the Industrial Division, Bryant Heater Co., 1020 London Road, Cleveland 10, Ohio.

Tramrail systems

A 10-page booklet by the Forker Corporation, manufacturers of Ohio Tramrail Systems, includes handling tools for many types of products plus a variety of ceiling conveyors.

Strip chart potentiometer catalog

The Strip Chart Potentiometer is the subject of the new catalog issued by the Brown Instrument Co., Division of Minneapolis-Honeywell Regulator Co. This development in temperature recording and control instruments is fully described and illustrated.

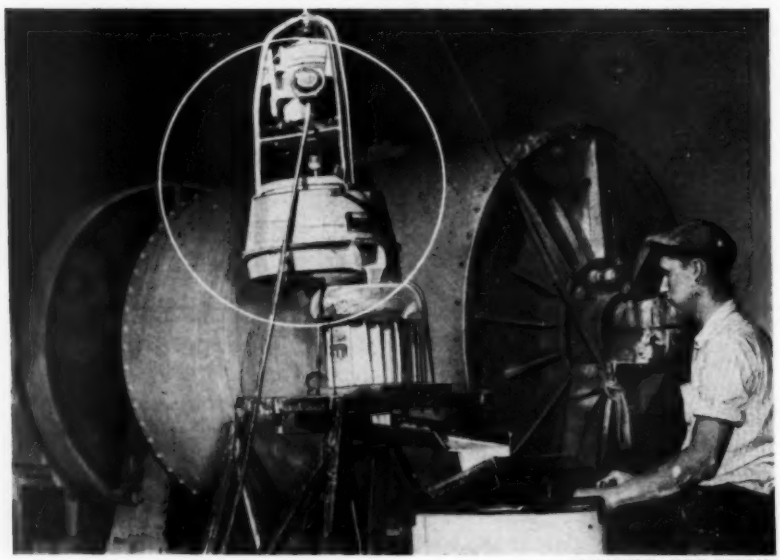
Included in the catalog are illustrated descriptions of various types of potentiometers such as standard speed, fast speed, potentiometer controls, thermocouple assemblies, etc.

Copy may be obtained by addressing the Brown Instrument Co., Wayne and Roberts Aves., Philadelphia 44, Pa. Ask for Catalog 15-10.

System of process heating

Details of a system of process heating, which uses superheated water.

Use *Rotospray* in the millroom and on the production line too



INSTALLATION, CLYDE PORCELAIN STEEL CORP., CLYDE, OHIO

Rotospray is a necessity in the well equipped mill room and it can be used on the production line too, wherever and whenever porcelain enamel slip should be sieved.

For the small shop, the ready portability of Rotospray is an important feature. For larger plants, it pays to have several units of the right capacity located at point of use for convenience and efficiency.

For standard millroom sieving, for ground coat dip tanks, for the reclaiming of cover coat enamels, or for *any* sieving job, the ruggedly built, dependable Rotospray is the answer.

Sold in three sizes. Outline the job and we will specify the right unit.

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"Worth waiting for"

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To get the tough, long lasting brick that will keep your mills running smoothly month after month without interruption calls for more than a carefully formed plastic shape.

The long firing cycle to which McDanel adheres, regardless of the pressure for increased production, results in *complete vitrification*. These *extra-fired* brick are tough—they're dependable — and that's what you want in your mills today, and every day.

That's why, with production doubled, we still can't keep up with orders. More and more enamel plant operators refuse to accept a substitute for McDanel long lasting mill lining brick.

Line all your mills with these *extra-fired* brick, then load them with McDanel *mill-tested* grinding balls, and you can forget about mill room grinding troubles.

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CHICAGO VITREOUS ENAMEL PRODUCT COMPANY • EXCLUSIVE REPRESENTATIVES FOR THE ENAMELING INDUSTRY.

are described in a booklet just issued. High temperature hot water heating is described as lending itself particularly to the manufacture of ceramics, chemicals, molded plastics, etc. The system consists of drawing water, at steam saturation temperature, from any standard industrial boiler and circulating it through a completely closed pipe system under high pressure by means of a specially designed pump.

For booklet, contact Blaw-Knox Company, Power Piping Division, Pittsburgh, Pa.

Electric draft control

A 16-page illustrated bulletin "How To Cut Your Fuel Bill" presents diagrams showing how to stop combustion fuel losses. Different models of electric draft controls are illustrated, and installations showing definite fuel savings and elimination of smoke. Data are given on how electric draft controls operate with stokers, oil and gas burners. A list of users is also included.

Contact Campbell Engineering Co., Appleton, Wisconsin.

New Catalog on "Tumblast"

Complete information on a new Wheelabrator Tumblast, said to be the largest machine of its kind ever built, is contained in Catalog No. 264 just published. The 60" x 96" machine is the newest addition to the standard American line of Airless Blast Equipment.

There are now 8 sizes of this type blast cleaning machine available, ranging in capacity from 1 cubic foot to 63 cubic feet. A copy of the catalog may be obtained directly from American Foundry Equipment Company, 555 S. Byrkit St., Mishawaka, Ind.

Electrical indicating instruments

Marion Electrical Instrument Company announce that their new comprehensive catalogue is now available. This 28-page book illustrates and describes the Marion line of standard and hermetically sealed electrical indicating instruments, including their very latest developments in the instrument field.

The catalogue will be sent, free of charge, upon request to Marion Electrical Instrument Company, Manchester, New Hampshire.

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Successor to W. B. Lawson, Inc. and Ferro Drier & Chemical Co.
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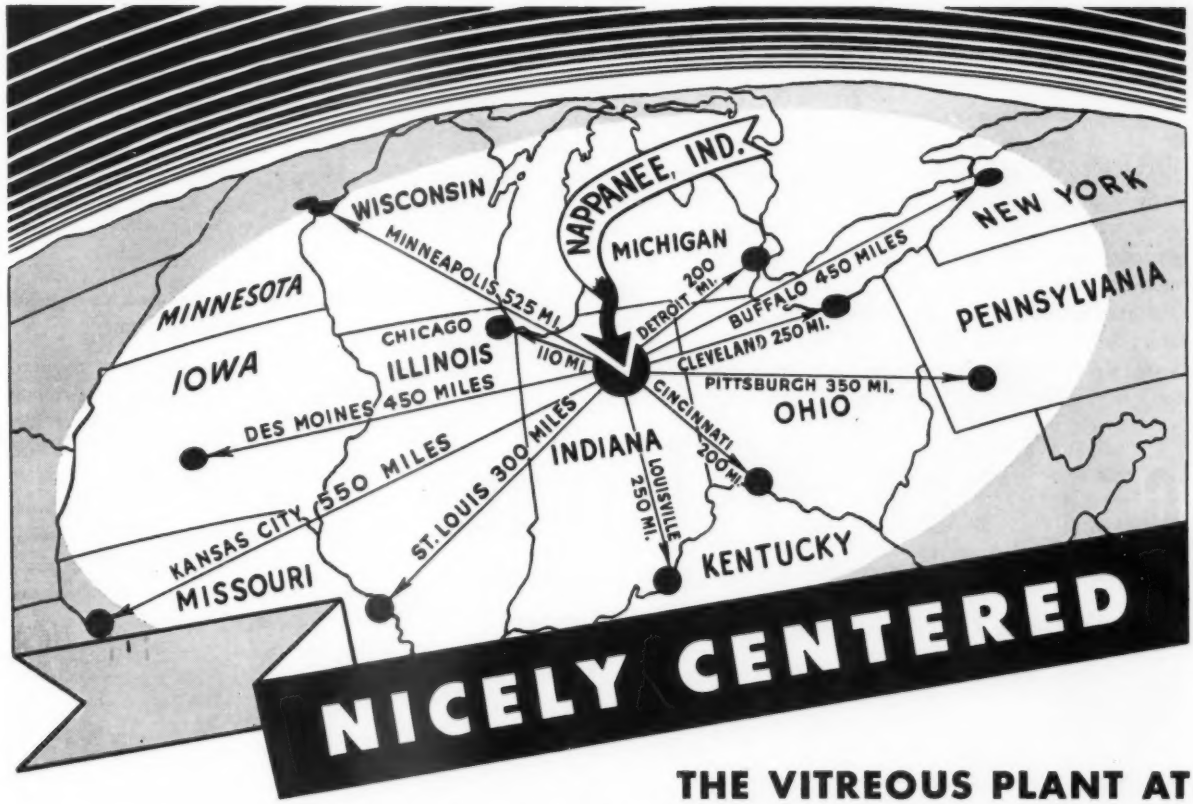

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While we ship many carloads of Porcelain Enameled parts to the east coast and to the far west, many of our customers prefer highway shipments. Our trucks and the trucks of commercial carriers running through Nappanee make fast time from our plant to yours.

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It is equally practical to get black iron parts formed in your plant shipped into our plant for enameling.

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More industry news and personals

New enameling company at DeKalb, Illinois

DeKalb Enameling Company, Inc., is the name of a new porcelain enamel jobbing plant now under construction at DeKalb, Illinois. The officers of the new concern are: R. J. McCann, president; J. T. Katz, treasurer; W. T. McCann, secretary; and S. R. Katz, vice president. Three of the officers are World War II veterans. R. J. McCann, president, was with National Enameling and Stamping prewar, with McDonnell Aircraft during the war, and for a short time postwar was with Wrought Iron Range.

Building alterations incidental to the installation of a 5′ x 12′ radiant tube furnace have been completed. At the present rate of construction it is expected that the company will be ready to operate on or about March 1, 1947. The plant comprises 8500 square feet of floor space, with an additional 20,000 square feet available for expansion as required.

The new company will serve as a jobbing plant for both sheet steel and cast iron porcelain enameling.

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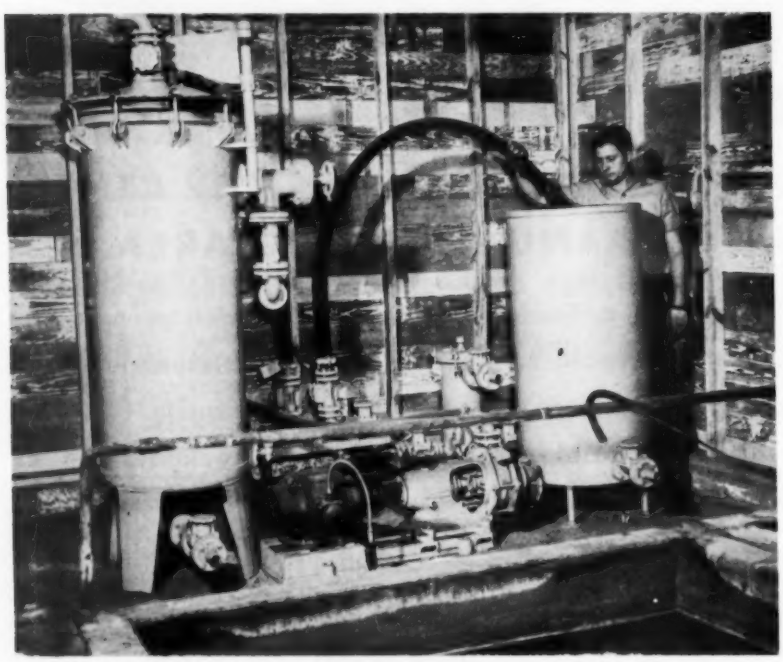

A typical Industrial Filter installation in the pickle room at Ingram-Richardson Mfg. Co. of Indiana, Frankfort, Indiana.

Save time, save money, and keep your new pickle room at top efficiency. Include Industrial pressure Filters in your plans for a modern plant. Send for specifications on a unit to meet your requirements for a dependable clarification and purifying system.

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Automatic Filter powder feeders, special alloy pumps, Filter cloth and Filter Aids

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Graham Bell opens new Canadian enameling plant

Announcement has been received by *finish* of the formation of Graham Bell Enameling Limited, Streetville, Ontario, Canada. Bell, formerly with General Steel Wares, has with him as officers in the company George Burton, vice president in charge of engineering, and Joseph Axon, vice president in charge of production. Secretary of the company is John S. Wright.

Final decision to go ahead with the plant was made on September 1, and as this is written the plant has been completed and equipment is being rapidly installed so that it is expected to have the plant in operation early in 1947.

Bell, a porcelain enamel enthusiast for many years, envisions great possibilities for the new enterprise. He said there is a large market for all types of porcelain enamel, including signs, architectural porcelain, stove parts, refrigerator and display counter panels, food liners, reflectors, plumbing supplies, chimney liners, coal chutes, cooking utensils, hospital ware, table tops, etc. Said Bell, "We have the practical experience and the technical knowledge of all of the items we plan to manufacture with 70 years combined experience in the three members starting the company."

Stress luxury, convenience when selling laundry equipment

Helen W. Kendall, household equipment editor of "Good Housekeeping," in addressing the Electric Institute, Washington, recently, stressed the fact that merchandisers should pound away at the "luxury angle" in selling home laundering equipment. The trend is to move the home laundry out of the basement and install equip-

to Page 64 →

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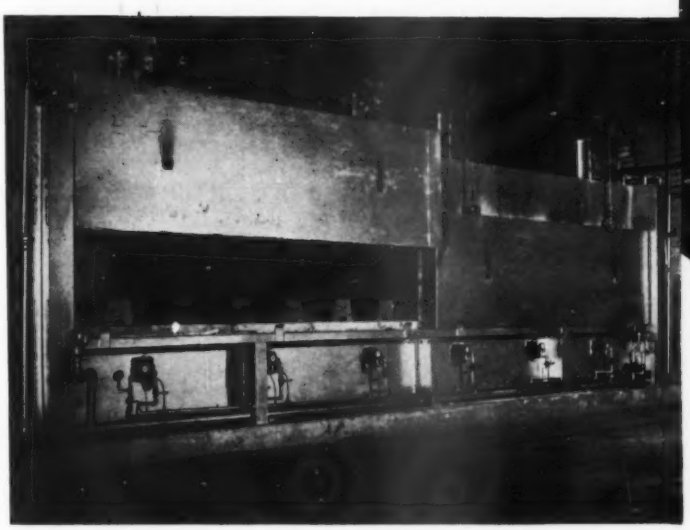

↑ Example of a furnace built and maintained by Huyck. Only one major muffle repair in nine years of operation.

← This furnace is typical of many of the large heat treating installations built by Huyck for war production.

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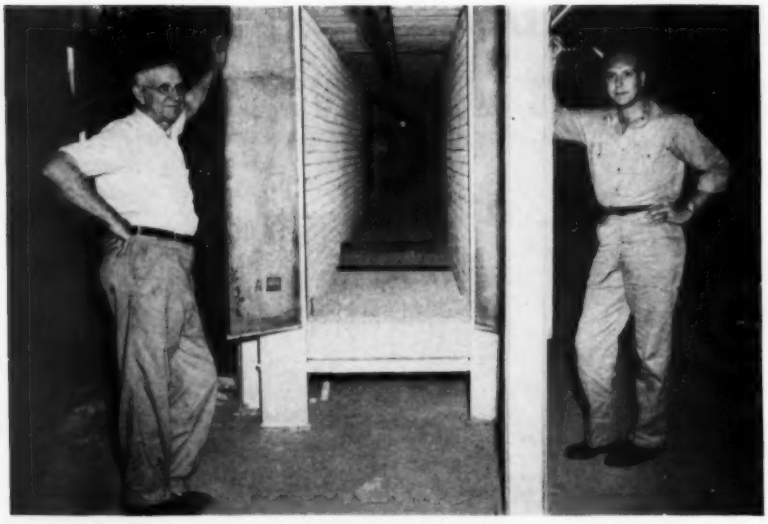
A visit to American Valve and Enameling Corp.

(Continued from Page 34)



Charles Wulf, Sr., and Charles Wulf, Jr., photographed at the open door of the new continuous furnace.

Applying two color dial markings to gasoline pump faces by screen process method. Each operator applies a color, both colors being fired at the same time.

enamel, you snap a pan on both sides of the block and when the mason lays the block the building is finished both inside and outside." According to Mr. Wulf, this process is covered by patents and will be licensed to other companies.

You find interesting things in a plant such as this when the boss man is the type who is never satisfied with conventional methods of operating and is always searching for a better way of doing the job.

Discussion of porcelain enamel defects

(Continued from Page 26)

temperatures. It also differentiates between different steels and ground coat enamels. It is a qualitative test but one which is extensively used.

Process and design defects

Although warping and hairlining may be caused by the design, the metal, the forming, or by improper handling, they are also firing defects. They may be caused by improper support in the furnace, unequal heating because of shading or proximity to other parts, or the use of an insufficient number of blunt points.

Process and enamel defects

Tearing is not a firing defect and scumming caused by the furnace atmosphere has already been discussed. Furnace scum, however, may appear with both over and under firing of certain enamels and is often influenced by the mill additions. The color, reflectance and gloss of enamels are affected by firing and are frequently the gage for good firing of cover enamels.

(1) W. W. Higgins and W. A. Deringer, A. O. Smith Corporation.

This series was adapted for finish *from a paper before the 7th Annual Porcelain Enamel Institute Forum.*

Gas sales rise in October

Sales of utility gas to ultimate customers in October, 1946, totaled 2,041,981,000 therms, an increase of 9.7 per cent over sales of 1,861,458,000 therms in October, 1945, the American Gas Association reported. The Association's index number of total gas utility sales stood at 174.7 per cent of the 1935-1939 average. For the 12-month period ending October 31, 1946, sales amounted to 26,022,092,000 therms, a decrease of 0.4 per cent under the like period a year earlier when sales were 26,133,231,000 therms.

Natural gas sales for October, 1946, amounted to 1,795,848,000 therms; sales of mixed gas totaled 85,711,000 therms; and sales of manufactured gas amounted to 160,422,000 therms.

Tappan delays model changes

Postponement of any major design changes in Tappan gas ranges until the summer of 1947 has been announced by A. B. Ritzenthaler, vice president in charge of sales.

ENAMEL PLANTS THAT REALLY WANT CLEAN ENAMELS INSTALL Frantz FerroFilters

Frantz FerroFilter installation at Electromaster, Inc., Mt. Clemens, Michigan. In its new $750,000 plant at Mt. Clemens, Michigan, Electromaster, Inc. included Frantz FerroFilters as standard equipment in its millroom. In the above picture is shown a gravity type Frantz FerroFilter in use. The milled enamel slip may be seen passing into the Frantz FerroFilter for removal of magnetic particles. This same plant utilizes a pipeline type Frantz FerroFilter on its ground coat circulating dip tank.

The story is the same in enamel plants throughout the country. Enamel plant superintendents know that they can be sure of clean enamels by using Frantz FerroFilters. And it makes no difference if they need a FerroFilter for general millroom use or one to be used on the circulating dip tank. Frantz makes a Frantz FerroFilter for every need. If you haven't yet used a Frantz FerroFilter you don't know how clean enamels really can be.

CHICAGO VITREOUS ENAMEL PRODUCT COMPANY, 1427 South 55th Court, Cicero 50, Illinois

Exclusive Sales Representatives for the Porcelain Enamel Industry

S. G. FRANTZ CO., Inc.

161 GRAND STREET
NEW YORK 13, N. Y.

The approach of a buyer's market

(Continued from Page 30)

tailer and manufacturer of gas and electric ranges and other big ticket items need. It is reported, with considerable show of authority, that the reason Regulation "W" is so dear to the hearts of the R.F.C. is because it is the most effective tool it has for the regulation of business. Raising or lowering federal reserve bank discount rates is slow and not too effective; slowing down the sale of consumer durable goods is a quick and positive method of control.

I do not expect any disastrous break; I do not believe there is any calamity in the making, but I do think that our spell of fair weather is coming to an end and that we should get our umbrellas and hunt up our rubbers, so we can get them quickly if we need them. It won't do any harm to be prepared even if deflation does not come for some time.

The "lower prices" responsibility

As the war gets further into the background people are going to expect lower prices. Higher prices are accepted as a concomitant of the war, and the period immediately following the war, but a recession in prices is expected as we get further away from the war. This is a tough problem, with wages fixed at a high level and material prices high, but it is a problem that the stove industry will do well to solve without sacrificing quality. Possibly higher efficiency in the plant, better tooling and better planning will help. There are many people who claim that distribution costs are much too high. I have no opinion on this. The Department of Commerce is studying the problem.

With prices decontrolled, our test has come. If the prognosticators are right, we are standing at the top of a long decline, lasting all through next year (1947) and probably 1948. The descent may not be rapid enough during the first two or three months, or even the first six months to be noticeable, but during the latter part of the year the acceleration downward will increase and it will be unwise, in my opinion, for any manufacturer to lose his head on this question of prices . . . . nothing could hurt the stove industry or the individual members of the industry any more than to have a long period of deflation, with dealers objecting to our prices and consumers refusing to buy beyond their actual current needs; high prices can bring about that situation.

Added plant capacity calls for a new concept of "selling"

Many manufacturers have added to their capacity by building new plants, adding to their present plants or re-equipping their factories. New manufacturers with large potential production have entered the field and, if we are to prosper, all these factories and additions must be kept running; 58-million people must be employed in the United States . . . and the cooking and heating industry must do its share.

The only solution to the problem before us is to make more stoves and sell more stoves. I believe we can do it if we will. Members of the stove industry have never done selling comparable to that done by other industries. I am certain that our products have not been sold aggressively in the past. This may be due to some inherent difference in our product; it may be due to lack of appreciation of the value of advertising; it may be due to the small gross profit that our product pays, but whatever the cause the fact remains.

If you thumb through a copy of any of the popular magazines you will see manufacturers of basic materials taking more space and spending more money, to convince the public that it should insist on having its goods made of magnesium or aluminum or stainless steel, than you will stove men advertising the beauty and utility of their products. As an industry we have never advertised. We are probably weak also in our selling . . .

The one thing that seems certain is the advent of the buyer's market with its demand for better values and better practices during 1947, possibly during the first quarter, probably during the first half, but certainly during the year, and it behooves us all to set our houses in order and think of service to the public as a responsibility equal to our responsibility to our owners and our employees. The issue cannot be dodged; it cannot be postponed; we must face it and the sooner we begin to think about it the more intelligent our solution of the problem will be. Gentlemen, look out for the buyer's market; you can feel its hot breath on the back of your neck now.

Appliance selling in 1947

(Continued from Page 31)

country should be lacking in the intelligence, the imagination and the intensity of effort essential to successful selling in 1947, our rich nation, capable of buying all the goods that can be produced in all our factories, will fail to buy and thus unbalance our entire national economy to the impoverishment of all.

I trust that the cooking and heating industry will meet the selling challenge of the hour and in 1947 make its contribution to the era of prosperity for which a war-weary people, starved for so long for so many things, is waiting so impatiently.

Condensed from a speech delivered at the fourteenth annual convention of the Institute of Cooking and Heating Appliance Manufacturers.

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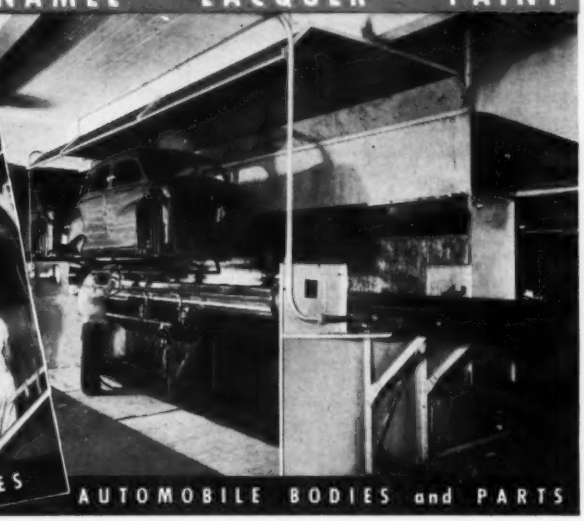

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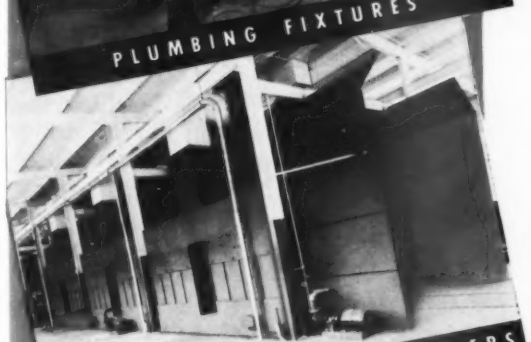

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Regardless of what your product may be, regardless of its shape or size, the Mahon organization is prepared to plan, engineer, build and install a complete Finishing System to handle your particular finishing job on a straight line production basis—a finishing system that will produce the finest finish possible at the absolute minimum cost per unit. For over twenty-five years Mahon engineers have pioneered in this highly specialized field, and have gained recognition throughout the world in every industry where finishing constitutes a major production operation . . . this experience, and constant research and development, have endowed them with a wealth of technical knowledge and practical know-how not available to you elsewhere. Consultation will not place you under obligation.

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MAHON

Forming Lubricants

(Continued on Page 22)

extended periods without cleaning and if the lubricant has corrosive tendencies, the tool surfaces will be attacked.

Ease of removal is very indicative of lubricant value. The difference between cheap and costly cleaning methods, each productive of the same results, may logically be considered a part of lubricant cost. Also, (and shop operators should keep this firmly in mind) the cost of a lubricant may not be a true indication of its value.

Ease of removal

In discussing this subject with enamelers, there is little use to dwell on its importance. Complete removal is necessary, and there are no halfway alternatives that will suffice. The only problem involved is the cost of complete removal, and here again we are on familiar ground. Unless very specialized conditions are involved, unless the lubricant can be completely removed by conventional alkaline cleaning, furnace scaling and pickling methods, it has no place in the average enameling shop. Prior information on cleaning published in *finish* makes further discussion of this point unnecessary.

Spreading power

During tests with any forming lubricant, close observation of its spreading power should be made. Good spreading power is important for two reasons — first, a lubricant that will spread well need not be applied to all portions of the work prior to press operations; secondly, spreading power of the lubricant must allow it to follow the work as it is stretched and formed in the press.

Here again we encounter oiliness and the ability of a lubricant to form an adsorbed film. Molecular forces contributive to these characteristics contribute also to the spreading power of the lubricant.

The healing power of a lubricant, that is its ability to reform an oil film after rupture, is entirely dependent on spreading power. During any severe forming operation, pressure centers change as the shape of the work progressively conforms to the tool. If rupture does occur during the instant of greatest pressure, the ability of the oil film to "heal" immediately when this pressure is lessened is very important.

When testing a lubricant for spreading power, do not apply it to the entire work surface, but at points where high pressures will develop first during the press operation. Examine both the work and tool surfaces after the operation, and make certain that the oil film has spread to cover all contact areas.

Adhesiveness

At first glance the adhesiveness of a forming lubricant would seem to be entirely associated with oiliness and film strength properties. This is true, and its importance in this conjunction has been implied. But there are other factors less closely associated with product forming that need mention at this point.

The only portion of a forming lubricant which serves a useful purpose is that portion which actually remains on the work during the press operation. Thus an oil with poor adhesive qualities when in the form of a viscous film will drip from the work during its transfer from stack or bin to the press. This may result in too little lubricant being used, and will always result in unclean shop conditions and waste. Alternately, a lubricant with excessive adhesive powers will cling to the work in excessive quantities that will be squeezed out and wasted during the press operation. Aside from the waste involved, either condition makes the work unpleasant to handle. Also, excessive adhesiveness may require the use of power spray methods in subsequent cleaning operations.

Stability

As a forming lubricant may consist of a non-colloidal, a colloidal, a solid suspension, an emulsification, or a simple mixture, its stability upon standing is important. A stability test should be made on any untried lubricant prior to purchase in large quantities. Preferably, there should be no separation of compound constituents upon standing for a reasonable limit of time. When separation does occur, only a simple mixing operation should be required to return the compound to its original form.

More important yet, no chemical change should occur during storage periods. Most lubricants contain inhibitors, such as benzoic acid, to prevent this contingency. A rancid oil condition will, aside from having deleterious effects on the work and tool, usually be evil-smelling and often physically injurious to the users.

Corrosiveness

Here again we tackle a subject with which every enameler is thoroughly acquainted. Though the corrosive tendencies of a forming lubricant may not be so important with work that is cleaned immediately after forming, the effect of such corrosion on the uncleaned tool surfaces is readily apparent.

There is one aspect of corrosive lubricants, however, that is not always appreciated — that is use of a corrosive lubricant in excessively severe forming operations. Actually the corrosion that occurs is caused by formation of an adsorbed film so tenacious that partial chemical combination occurs. In enameling work, however, there is the difficulty that such a film would be disadvantageous because of difficulty of removal. Subsequent investigation may indicate that heavy furnace scaling and sandblast methods of cleaning will remove this film when it is required for specialized drawing work. Insofar as the author is aware, however, this has not been proven to date.

Psychological and physical effects

It is true that most lubricant manufacturers use care in compounding forming lubricants so that physical effects on the user will not be experienced. On the other hand, psychological effects are often ignored. Any

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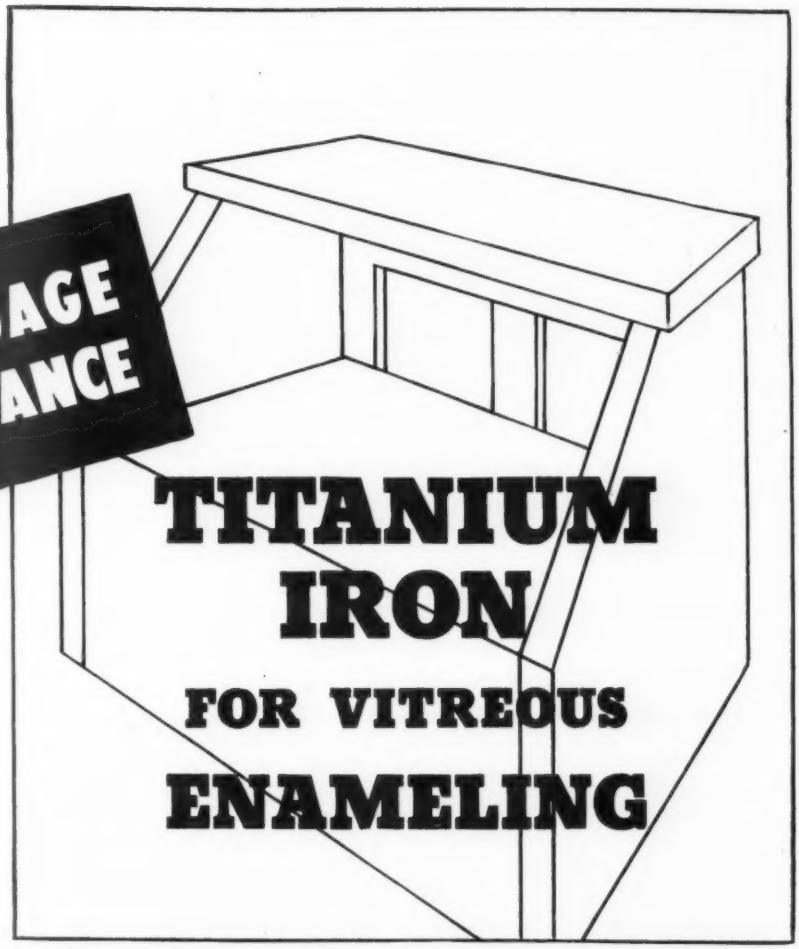
THINNER GAGE SAG RESISTANCE



TITANIUM IRON FOR VITREOUS ENAMELING

ENAMELED WARE of lighter gage stock can be fabricated to desired shapes and retain a better appearance because of the increased sag resistance of Titanium iron for vitreous enameling. This particular feature is clearly demonstrated on chart at right.

Another feature is the elimination of formerly necessary ground coats. For—under proper shop conditions—the cover coat can be applied directly to the base metal. Also, these thin finishes reduce the hazards of chipping and breaking. Furthermore, at enameling heats, there is no sign of enamel boiling. During three years of both research and production experience, no case of fish scaling has been reported.

Further information is available upon request.

EFFECT OF GAGE AND COMPOSITION ON SAGGING RESISTANCE

GAGE AND COMPOSITION	DEGREE OF SAG IN %
24 Ga. Standard Enameling Iron	100
24 Ga. Titanium Steel	57
18 Ga. Standard Enameling Iron	100
18 Ga. Titanium Steel	18

The Titanium Alloy Manufacturing Company produces the titanium alloy used in the manufacture of this steel. For samples of this steel, see your steel supplier. Pending patent applications on the new enameling process and products made thereby are owned jointly by Inland Steel Company, and The Titanium Alloy Manufacturing Company under trust agreement.

TAM

TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 Broadway, New York City General Offices and Works: Niagara Falls, N. Y.

shop superintendent, experienced in handling men, will agree that psychological effects are very important from the standpoint of worker efficiency. A lubricant with an evil smell, or one that clings to the hands is certainly not a desirable product. It is certain that the average worker will skimp on the use of such compounds whenever possible, with resultant poor workmanship and many rejects.

In certain instances, the use of such a lubricant may be necessary. Under these conditions, everything possible should be done to minimize unpleasantness. Moving air ventilation carrying odors away from the worker, rubber gloves for handling, and methods of lubricant application that are quick and easily accomplished will all aid the cause.

It is realized that in this article a very complex subject has been handled in a very sketchy manner. It is hoped, however, that a single objective has been attained — that of enumerating the more desirable forming lubricant characteristics so that they may be recognized and evaluated under actual shop conditions. It is considered by the author that every shop operator, aware that certain characteristics are both attainable and variable, will be able to conduct tests in his own shop to determine an optimum combination of characteristics best suited to his own requirements.

A completely conveyorized plant for stove work and jobbing

(Continued from Page 18)

The men who "make the wheels go round" — Homer Gray, enamel superintendent, and shift foremen Walter Fox, Orei Ownby and Louis Bradley.

conveyor, which delivers the work to be brushed and transports it from final brushing, bringing it at last to the transfer station for manual loading on the furnace conveyor chain.

Behind this brushing area, and its encircling overhead conveyor system, an area is set aside for graining operations. Work of this nature is carried on the brushing conveyor to and from graining.

Frit storage, mill room and control laboratory

In the basement underneath the porcelain enamel plant's main floor, a very large frit storage area is maintained as well as a 100′ x 30′ mill room, in which the laboratory equipment is also housed. The milled enamel, in standard pressure tanks, is moved up from mill room to the spray booths of the first floor on a large, open, outside ramp by pallet and lift-truck.

The mill room has a walk-way accommodating its far side. The ball mills are serviced by overhead monorail. The mills are banked in line thus: two 1000 lb.; two 500 lb.; one 300 lb.; one 150 lb.; and one 75 lb. — the latter for special runs and experimental mixes. (One 2000 lb. and one 500 lb. mill will be added.) Two 300 gallon and one 150 gallon wet storage tanks are positioned in line to service the first three mills. A wash sump, 6′ x 9′, catches floor drainage. The front wall, left of entrance, is for pressure tank storage, while laboratory equipment is located at the side and end of the mill room, right of entrance.

Presently, 20 different formulae are being used. Laboratory operations are simple, standard and thorough. Close control is maintained per batch on fineness and specific gravities. There is nothing new or novel in the Brown laboratory procedure. All porcelain enamel mixes are run through magnetic separators. A sample of each mix runs the furnace line and is given standard laboratory inspection before it gets the OK for production.

The general architect of the building is Selmon T. Franklin, and the designing engineer of the porcelain enameling layout is Merse M. Murphy, of Chattanooga.

Men are important in household purchasing

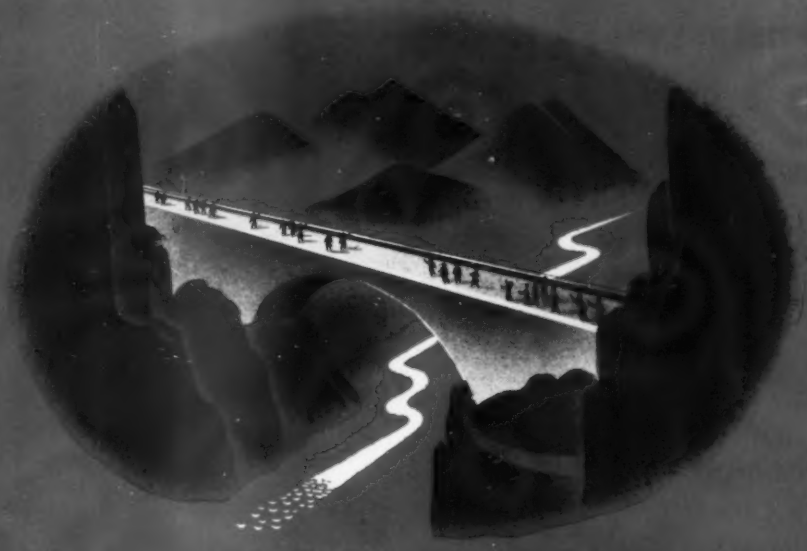
When it comes to making household purchases, men are more important than we sometimes think.

In a nation-wide survey made by a Kentucky furniture manufacturer, 6,000 women were queried, "Do women dominate the household purchases?" The answer was, "No."

According to the survey, only 39 per cent said they acted independently in selecting home furnishings, and only 29 per cent decided how much to pay.

In the sale of kitchen equipment, as in furniture, men are important factors.

Save time and effort by using porcelain enameled kitchen ware. You can cook foods in the cool hours and store them in the same utensil until mealtime. Food is safely stored in porcelain enameled utensils, since the non-absorbent surface does not permit any foreign tastes to seep through.



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